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ABSTRACT

This final report of a project involving instructional television as part of elementary school science provides information relevant to the development of the science program based on a nine function model. These functions include the problem derivation and all the steps of research technique thrcugh implementation and recycling. The materials needed to implement the program are submitted in two forms: television video tapes and a handbook for teachers. The report includes a list of referecnes, various research instruments used, summaries of visits made to classrooms using the program, and reactions of the advisory committee. Tables are presented showing teacher responses to evaluation questionnaires and other data analysis. (EB)

SCIENCE FOR THE SEVENTIES

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science for the seventies and instructional television

phase I

project report

ED 096159

SCIENCE FOR THE SEVENTIES

and

INSTRUCTIONAL TELEVISION

The Final Report

of

A Project in the Use of Televised Instruction
As a Component of the Systematic Development of an
Instructional Thrust in Elementary School Science

Prepared

for the

Pennsylvania Department of Education

by the

College of Education and Division of Broadcasting

of the

Pennsylvania State University

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Pennsylvania General Assembly

October 1973

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Valuable support and assistance was provided by: Dr. Irvin Edgar and the SFTS Committee; Dr. George Shoffstall and Dr. Phillip Becker, science content specialists; Dr. Ardele Feeley, Mr. Harold Yoder and the teachers of the Altoona Schools who assisted in project evaluation; Dr. Roy Allison and Dr. Duane Smith who tested project materials in the Harrisburg area; numerous teachers and children in central Pennsylvania who assisted in program production and evaluation; and Miss Sheri Cramer who provided valuable management and clerical support.

A special word of gratitude is extended to Dr. Nile Coon, Dr. Irvin Edgar, and Mr. Blaze Gusic of the Pennsylvania Department of Education for their constant cooperation and encouragement in the development and conduct of this project.

Paul W. Welliver
Project Director
University Park, Pennsylvania
October 31, 1973

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INTRODUCTION

Science for the Seventies

One of the responsibilities of the Bureau of General and Academic Education within the Pennsylvania Department of Education is to provide curriculum guidelines and instructional assistance to schools throughout the State. In response to this charge, the Bureau's Division of Science and Technology has developed materials in the field of elementary school science under the title of "Science for the Seventies." Under the leadership of Dr. Irvin T. Edgar, Chief of the Division of Science and Technology, Pennsylvania State Department of Education, a committee of about a dozen science educators from throughout the State has worked on this project.

The nature of "Science for the Seventies" is unique. It is not a new elementary science program developed for statewide use. It is, rather, a thrust designed to stimulate school systems and teachers to take a look at their science instruction and work toward improving it. Perhaps this philosophy is best expressed in the following statement from the preface to the SFTS materials:

> "The existence of various national programs for elementary science is obvious to the most casual reader of professional publications. Science For The Seventies is designed to support the intent of these programs and does not attempt to supplant them. Nor do the originators of the series expect that schools will discard any existing science programs to "wipe the slate clean" and begin anew using the ideas presented by SFTS, unless of course such action is indisputably justified. Instead, by identifying appropriate activities and

> procedures to consider and adapt to a variety of circumstances, SFTS provides assistance to persons interested in improving their elementary science instruction, regardless of the program they are now using." (PDE, 1971:7)

"Science for the Seventies" is centered upon twelve general aims (PDE, 1971:9-10) that have been identified as important to elementary school science. These aims are translated into specific behavioral objectives which accompany sample lessons. Both the aims and objectives reflect a strong orientation toward the processes of science.

SFTS and Systematic Instructional Development

SFTS is, therefore, an effort to bring about an improvement in science instruction in the elementary school classrooms of Pennsylvania. But, to attain maximum effectiveness, every available channel and procedure must be employed to disseminate and implement the message and thrust of SFTS.

To accomplish this on a state-wide basis with a minimum of wasted motion and duplication of effort, carefully constructed plans are essential. Greatest efficiency is possible through the use of a tested model for instructional problem solving and development.

Such a model has been developed by the National Special Media Institute. In this model, the instructional development process is centered around a nine step procedure for applying general systems theory to instructional development. In this project, it was proposed that as SFTS moves into an active implementation phase, employing such techniques as instructional television, this step could be most effectively taken through the application of the procedures of instructional development.

This model, which provides a process for raising the probability of instructional success, can be summarized in the following stages and functions. (NSMI, 1971)

Stage I: Define

Function 1: Identify Problem
Function 2: Analyze Setting
Function 3: Organize Management

Stage II: Develop

Function 4: Identify Objectives
Function 5: Specify Methods
Function 6: Construct Prototypes

Stage III: Evaluate

Function 7: Test Prototypes
Function 8: Analyze Results
Function 9: Implement/Recycle

The meaning of these steps and their application to SFTS can be described briefly.

Stage I: Define

Function 1: Identify Problem. This step involves activities such as assessing needs, establishing priorities and clearly stating a particular problem upon which everyone involved can agree." Generally, this is accomplished by describing existing circumstances, formulating an ideal situation and then defining the discrepancy between the two as the problem.

Function 2: Analyze Setting. The second step is to collect and locate relevant information on the audience being dealt with, the circumstances and conditions under which the problem is to be approached, and the resources that are available to deal with it. The type of input for

this stage comes from a variety of sources including professional literature, published research and surveys, as well as preliminary assessments that can be carried out.

Function 3: Organize Management. With the recognition of extensive needs and resources that can be applied to these needs, the next step is to organize tasks, responsibilities, and timelines to approach the problem.

Stage II: Develop

Function 4: Identify Objectives. The next step is to specify terminal and enabling objectives which clearly describe desired changes.

Function 5: Specify Methods. Instructional strategies, materials, and resources are selected which provide a maximum impact upon the defined objectives.

Function 6: Construct Prototypes. All previous efforts are brought together in the design, production, and assembly of instructional packages and procedures for tryout and testing.

Stage III: Evaluate

Function 7: Test Prototype. The prototype must then be tested on a representative sample and evaluation data recorded and collected.

Function 8: Analyze Results. All data from all previous functions is analyzed and interpreted.

Function 9: Implement/Recycle. As a result of the previous review and analysis, the decision is made to either implement the procedure on a full scale or to return to a previous function for revision or modification purposes.

Project Report Format

The outline and discussion of an instructional development model that has been presented above provides only the barest framework of an instructional development system. More detailed steps of this model were used in the project development. Some of these will become evident as we describe the development of the project as it evolved in the context of this nine function model.

FUNCTION 1: IDENTIFY PROBLEM

The procedure for arriving at a preliminary problem statement was to derive the problem as a discrepancy between the way things presently exist in primary grade science (status quo) and the way that you would most like them to be (ideal).

Problem Derivation

Status Quo

Children in the majority of the primary grade classrooms in the schools of Pennsylvania are receiving little or no instruction in the field of science. A large proportion of the science instruction is book and/or nature-oriented and is not consistent with the best in current thinking relative to appropriate approaches to elementary school science instruction.

Ideal

Each child of primary grade age in Pennsylvania will receive science instruction that is conducted on a regular basis and is carried out in a manner that is consistent with the best in current elementary school science instructional practices.

Problem Statement

Procedures are needed to implement regular and valid science instruction for primary grade children in Pennsylvania.

Tentative Solution

Within the constraints of a grant designated specifically for instructional television, procedures will be developed to facilitate the transition from a lack of valid science instruction in the primary grades to a situation in which regular, quality instruction is being offered.

FUNCTION 2. ANALYZE SETTING

In the analysis of the setting, all information and resources were considered that seemed to have some bearing on the development of the project. Key factors are described below.

Primary Grade Science Learner Characteristics

The characteristics of the elementary school children for whom SFTS is designed are described in the SFTS publication under a section entitled, "Why Science for the Seventies." The following discussion is quoted from that chapter. It should be noted that this project is being prepared for primary grade children who range upward in age to about nine years old.

Experience with and studies of children have shown that the child grows through successive stages in which he may learn new ideas in limited ways. At certain times a child's intellectual development will allow him to behave in ways an adult would consider unscientific and illogical. At the same time a child may consider such actions as both scientific and logical.

In an attempt to discover how intelligence develops, Jean Piaget, a Swiss psychologist, experimented with children to find out how they learned. His findings indicate that intelligence develops through four successive stages: sensory-motor, pre-operational, concretely operational and formally operational. Each stage of intellectual development is characterized by a rather specific, identifiable mode of thinking. The recognition of a child's thinking as evidence of a particular stage of intellectual development may enable the teacher to provide learning experiences appropriate for that

stage of intellectual maturity. From birth to approximately 18 months of age, the learner is in a pre-verbal stage of development and relies on sensory-motor. Objects exist only while they are detected by the senses, or are located through random physical searching. Some practical knowledge is developed in this early stage that is used in the learning activities of later stages as the child identifies with reality, space, objects and the people in his life.

In the stage described as pre-operational or representational, from 18 months to eight years approximately, the learner begins organized language development and uses some related symbols in his thinking. Especially important to science instruction is the recognition that children at this stage cannot always reason by implication or coordinate variables, and they often fail to recognize crude trial-and-error activities as valuable in reaching simple goals. As a result, experimentation needs to be simple, with variables tightly restricted and based on investigations which require recognition of single or limited properties of objects only. Of particular importance is the learner's frequent satisfaction with several contradictory explanations for a single event, and his inability to operationally reverse his thoughts and actions. A mass of clay with a certain size, when separated into two parts, may not be recognized by the learner as possessing the same total mass or being capable of restoration to its original conditions.

During the early school years the learner passes through what Piaget calls a concrete operations period where real things can be ordered, related and manipulated in space and time. The learner can perform elementary logical operations, and recognizes the idea of conversation of length,

matter, weight and volume in objects. For example a length of wood which is cut into parts can be visualized by the learner as capable of restoration to its original length. However, the learner will still have difficulty isolating variables and will prefer to proceed step by step in thinking without necessarily relating each step to the others.

The development of abstract thinking ability is marked by reasoning sequences of the learner using symbols for concrete examples in many possible combinations, development of a system of combinations and unification of the operations into a "whole". Then follows the ability to perform controlled experimentation, to regulate all variables except one and to do other increasingly complex patterns of throught.

It is important for elementary teachers to realize that learners undergo such stages at varying rates and that students may not be able to understand certain science activities because they violate the learner's mental conceptualizations. Few curriculum areas are able to provide so many opportunities for confronting and investigating life as does science. Since in the final analysis it is the teacher who determines the curriculum, teachers need to provide for learning in science which builds upon the natural development of children. Therefore it will be necessary for the teacher to explore the many facets of the child's world in the process of accomplishing the major goal of science education which is to produce tomorrow's problem solving citizen.

Because of the nature of this project, it was directed toward learners representing all of the wide diversity of backgrounds which exist in a state that is as heterogeneous as Pennsylvania.

Status of Elementary School Science in Pennsylvania

In 1972, the Educational Development Center in WilkesBarre conducted a thorough study to determine the current status of elementary school science instructors in Pennsylvania. The final report of that study has not yet been issued and, therefore, it is not possible to provide the data and conclusions that were brought to bear on this SFTS-ITV project. However, through interviews with the investigators and informal reports of the findings, information was gleaned about the current status and needs of elementary school science in Pennsylvania that were applied to the development of this project.

Resources with Possible Applications to SFTS

In May 1971, a conference was held at University Park for the purpose of exploring possible resources that might be applied to implementing SFTS. Invited to the conference were individuals representing science education and a wide variety of media and technology - both educational and commercial. The following list of sample resources was introduced to conference participants.

Sample Resources

State curriculum bulletins
Textbooks
Supplementary books
Educational television
Educational radio
Regional Instructional Materials Centers
Intermediate units
Commercial television
Commercial radio

Sample Resources (continued)

Television cable companies
Home learning centers
Correspondence courses
Learning packets
Newspapers
Instructional columns in newspapers
Magazines
Comic books
Professional associations
Continuing education courses
On-campus courses
On-campus workshops
On-campus institutes
Teacher in-service training
Computer assisted instruction
Mobile computer assisted instruction
Local school media services
Libraries
Museums
Planetariums
Telephone
Dial access
Home telephone dial access
Film libraries
Free materials - government and industry, etc.

After the above list was reviewed, specific information and recommendations were offered about each of the following resources.

Items in Resource Inventory

Audio-Tutorial Instruction
Cable Television
Commercial television
Computer assisted instruction
Computer assisted instruction mobile van
Computer-based resource bank
Correspondence study
Dial access systems
Educational extension agent network
Educational radio
Educational television
Electronic video recorders
Intermediate units
Learning research centers
Multi-media kits
Newspapers

Items in Resource Inventory (continued)

Problem solving models
Regional instructional materials centers
Teacher information packets
Telephone
Television and radio sidebands
University Division of Instructional Services

Background Information Relative to Television Instruction

In the process of "analysis of setting" during the Conference for the Identification and Coordination of Learning Resources held on May 20, 1971, at the Conference Center at Pennsylvania State University, instructional television was identified as potentially a valuable resource for use in implementing and advancing the SFTS concept. Considering the primary goal of SFTS which is to improve elementary school science in Pennsylvania, the question arises as to the role that ITV can most appropriately play.

Role of ITV in SFTS

In a recent publication of the National Association of Educational Broadcasters (NAEB, 1970), there has been defined and described twenty-two current television applications to instruction. They are as follows:

1. Magnification and visual display
2. Specimens for behavioral analysis
3. Alternate means for film distribution
4. Communications channels for administrative prescription
5. Materials for drill exercise
6. Data storage and retrieval
7. Testing materials
8. Descriptive and solution elements for simulation and gaming experiences
9. Materials for auto-tutorial study
10. An electronic blackboard
11. Computer-related visual displays
12. The communication means for direct interchange
13. Topics for class assignment
14. Materials for diversion
15. Mechanism for visual surveillance

16. Materials for curricular enrichment
17. Articulable teaching elements
18. Electronic adjunct materials for correspondence course teaching
19. All the elements for total teaching
20. Linear programing materials for groups
21. Branch programing for groups
22. The facilitating mechanism for new instructional systems

Of these applications, several are not appropriate to broadcast television instruction. These include numbers 2, 6, 9, 11, 12, and 15. Others appear to be secondary considerations in the design of a series of television broadcasts for classroom use. These secondary considerations, it would seem, could all be explored within the context of the primary classifications that might most appropriately be weighed as principal emphasis areas for use of broadcast television in classroom instruction. These include:

16. Materials for curricular enrichment
17. Articulable teaching elements
18. Electronic adjunct materials for correspondence course teaching
19. All the elements for total teaching
22. The facilitating mechanism for new instructional systems

Two of these might be eliminated immediately from our consideration. Number 19 can be dropped because it would be generally agreed that television is probably not an appropriate device for accomplishing the total teaching task of elementary school science. Number 18 is also inappropriate since serious consideration of correspondence study in elementary school science, particularly in the primary grades, does not seem feasible. This leaves numbers 16, 17, and 22.

Of these, major focus on number 16 seems least productive. In this role of curricular enrichment, television becomes a dispensable adjunct to instruction. It may add something if used but it is not needed as an essential part of the instructional program. Teachers can too easily do

without it. If something has to go to cut costs, it can be television and it will never be missed.

Exclusive attention to number 17, articulable teaching elements, makes television an integral part of the instructional program. This makes teachers and students dependent upon television for an important segment of their instruction. However, if SFTS is to relate directly to this role, it would be dependent upon television for its existence and use. Those classrooms which cannot, or do not want to acquire television sets or use the medium would be excluded from SFTS.

The last of these applications, the facilitating mechanism for new instructional systems, appears to be a natural and extremely vital application of ITV to SFTS. In this role, the medium can be used to accomplish many of the other functions that are appropriate to broadcast television. It can magnify, display, drill, test, enrich, and do a number of other things. However, its major function and focus would be upon facilitating the thrust of SFTS - the improvement of science instruction in the elementary schools.

It is on the basis of this rationale that this approach to the use of instructional television was adopted for the SFTS-ITV Project.

Related Research in Instructional Television

In the design of instructional television programs, constant regard must be given to what is known about effective use of television from research that has already been done.

Chu and Schramm (1967) have summarized research in ITV up to 1967. Although their summary is almost six years old, it includes the bulk of the

studies in the field since the most intensive efforts in ITV research were put forth in the early and mid 1960's. In their book, the authors summarized research findings in sixty summary statements. A few of these are being cited and discussed to illustrate considerations that influenced the uses of television for SFTS.

A word of caution should be inserted to avoid misunderstanding. These statements are not proven facts. They are indications of what the research points to. In some cases, carefully designed approaches to television can run counter to these directions if the circumstances of the research are understood and the planned techniques are structured to take factors into account that were not considered or controlled in the research. However, care was taken to consider these findings, as well as subsequent research, in the structuring of the SFTS ITV presentations.

1. Television is most effective as a tool for learning when used in a suitable context of learning activities at the receiving end. (Chu and Schramm: 13)

The use of ITV with SFTS was designed in such a way that the television lessons both incorporated and introduced student activities consistent with, or part of, the SFTS thrust.

2. Television is more likely to be an efficient part of an educational system when it is applied to an educational problem of sufficient magnitude to call forth broad support. (Chu and Schramm: 15)

This conclusion supported the plan to relate the television presentations to an overall systematic approach to SFTS. In so doing, the use of television was not a separate entity but, rather, a part of a many-faceted thrust that could make a greater impact on instruction.

3. Television is more likely to be an efficient tool of learning if it is planned and organized efficiently. (Chu and Schramm: 19)

The use of the Instructional Development System contributed to this desired end. With clearly defined objectives and carefully selected instructional strategies, a greater degree of effectiveness was insured.

4. There is insufficient evidence to suggest that color will improve learning from film or television. (Chu and Schramm: 24)

More recent exploration in this area indicates possible advantages of color if used in cueing. Efforts were made to explore and utilize this potential.

5. Where learning of perceptual-motor skills is required, a subjective angle presentation on television will tend to be more effective than an objective angle presentation. (Chu and Schramm: 25)

Most presentations given on television ignore this finding by demonstrating for objective viewing. Care was taken to employ this information wisely.

6. Attention-gaining cues that are irrelevant to the subject matter will most probably have a negative effect on learning from instructional television. (Chu and Schramm: 27)

Violation of this finding has been increasingly obvious in recent years as efforts have been made to become more creative in instructional presentations. Creativity is a characteristic to be desired. Too much of this creativity has, however, been channeled into attention getting devices and techniques which are not only expensive but detract from learning. Probably, for this reason, the use of dramatization, animation, and humor have been found to generally contribute nothing to instruction. An effort was made to develop a sophisticated creativity which is directed toward relevant cues.

7. Inserting questions in a television program does not seem to improve learning, but giving the students a rest pause does. (Chu & Schramm: 31)

There exist some widely distributed ITV presentations in which questions are asked and no time provided for student reactions and responses. In this project, a strong emphasis was given to the appropriate uses of pauses for thought, response, and discussion.

8. If saving time is important, a television program can probably be shortened and still achieve the minimum requirement of teaching. (Chu & Schramm: 35)

A common fault of ITV presentation is the tendency to pack too much material into one presentation. Emphasis was placed upon simplicity of content, structuring and presentation.

9. Problem-solving instruction on television is more effective than lecturing where the materials taught involve the solving of a problem. (Chu & Schramm: 37)

Techniques were used to adapt tested problem-solving instructional strategies to television involving active interaction between students, teachers, and the televised message.

Developmental and Advisory Assistance

Extensive personnel resources were identified to assist in the SFTS-ITV effort. These included:

Members of the SFTS Committee
PPTV ITV Advisory Committee
Dr. Irvin Edgar, Chief, Division of Science and Technology, P.D.E.
Mr. Blaze Gusic, Educational Communications Coordinator, P.D.E.

Penn State University Science Advisors
Dr. Phillip Becker
Dr. George Shoffstall

SFTS-ITV Project Staff
Dr. Paul W. Welliver, Project Director
Dr. Dorothy Alfke, Elementary School Science Specialist
Dr. Robert Shrigley, Elementary School Science Specialist
Dr. Michael Szabo, Evaluation Specialist
Ms. Diana Dean, Executive Producer
Mr. Gary Perdue, Producer-Director
Mr. Ron Bricker, Editorial Assistant
Mr. Steve Hubicsak, Editorial Assistant
Mr. Frank Semmens, Cinematographer
Supporting staff and production services

FUNCTION 3. ORGANIZE MANAGEMENT

In order to coordinate the activities of all individuals and agencies involved, it was necessary to assign responsibilities to specific people and groups with a time line for completion of tasks so that all elements of the project could proceed smoothly and on schedule. Consideration of individuals and groups required to develop, approve, and be informed was important.

The initial planning and control procedures are presented below to illustrate the method used. This schedule had to be altered as the project progressed because of contingencies that arose. However, the process provided a way of monitoring the development of the project and served as a basis for schedule alterations. It also reflects how a wide variety of expertise was utilized in this developmental project.

Planning and Control Procedures

Function 4. Identify Objectives

A. Prepare project goals — July 5 - Nov. 1
   Develop - Alfke, Shrigley, Szabo, Welliver
   Approve - Edgar, SFTS Committee
   Inform - All participants

B. Prepare terminal objectives — July 5 - Nov. 15
   Develop - Alfke, Shrigley, Szabo, Welliver
   Approve - Edgar, SFTS Committee
   Inform - All participants

C. Prepare enabling objectives — July 5 - Feb. 28
   Develop - Alfke, Shrigley, Szabo, Welliver
   Approve - Edgar, SFTS Committee
   Inform - All participants

Function 5. Specify Methods

A. Develop general TV format to reach objectives — July 5 - Oct. 15
   Develop - Welliver and TV staff
   Approve - Edgar, SFTS Committee
   Inform - All participants

B. Determine the nature of related materials to accomplish objectives. — Oct. 1 - Feb. 28
   Develop - Welliver, Alfke, Shrigley, Szabo
   Approve - Edgar, SFTS Committee
   Inform - All participants

Function 6. Construct Prototypes

A. Prepare a total of twenty-five SFTS lessons — July 5 - Dec. 30
   Develop - Alfke, Shrigley
   Approve - SFTS Committee

B. Prepare preliminary TV lesson formats — Oct. 1 - Nov. 10
   Develop - Welliver, TV staff
   Review - Alfke, Shrigley
   Approve - SFTS Committee

C. Prepare pilot TV scripts — Nov. 15 - Nov. 30
   Develop - Welliver, TV staff
   Review - Alfke, Shrigley

D. Prepare related materials to supplement pilot TV lessons — Nov. 15 - Dec. 30
   Develop - Welliver, Alfke, Shrigley
   Review - Edgar

E. Produce pilot TV lessons — Dec. 1 - Dec. 30
   Develop - TV staff
   Review - Alfke, Shrigley

F. Develop evaluation plan to rest sample lessons — Oct. 15 - Dec. 1
   Develop - Szabo
   Review - Welliver, Alfke, Shrigley

Function 7. Test Prototypes

A. Tryout pilot TV lessons — Jan. 1 - Jan. 20
   Develop - Szabo
   Assist - Welliver, Alfke, Shrigley

B. Collect data on rest of lessons — Jan. 1 - Jan. 20
   Develop - Szabo
   Assist - Welliver, Alfke, Shrigley

Function 8. Analyze Results

A. Identify discrepency between results and intent in TV lessons — Jan. 20 - Jan. 30
Develop - Szabo
Assist - Alfke, Shrigley, Welliver
Inform - Welliver, TV staff

B. Identify discrepency between results and intent in supporting materials — Jan. 20 - Jan. 30
Develop - Szabo
Assist - Alfke, Shrigley, Welliver

Function 9. Implement/Recycle

A. Prepare TV scripts based on results of pilot — Jan. 1 - Feb. 28
Develop - Welliver, TV staff
Review - Alfke, Shrigley
Approve - Edgar, SFTS Committee

B. Prepare related materials based on results of pilot — Jan. 1 - Apr. 15
Develop - Welliver, Alfke, Shrigley
Approve - Edgar, SFTS Committee

C. Produce TV lessons — Jan. 1 - Mar. 30
Develop - TV staff
Review - Welliver, Alfke, Shrigley
Approve - Edgar, SFTS Committee, ITV Committee

D. Tryout TV lessons — Jan. 1 - Mar. 30
Develop - Szabo
Assist - Welliver, Alfke, Shrigley

E. Revise on basis of tryout — Feb. 1 - Apr. 15
Develop - TV staff
Review - Welliver, Alfke, Shrigley, Szabo

FUNCTION 4. IDENTIFY OBJECTIVES

Based on the problem that has been identified and the information gathered relative to the problem, the following terminal objectives were prescribed as eventual outcomes of the project. It is essential to note that all of these objectives specify behaviors which are to occur following the broadcasting of the programs by broadcast councils within the State. Since no broadcast council will be offering the programs for several months following the end of this project, the ultimate assessment must be made at a later date. However, careful evaluation has been made during the project to determine if development has been taking place in an appropriate direction. The results of this evaluation are reported in a later function.

Prepared Terminal Performance Objectives

1. Following the broadcasting of SFTS oriented televised lessons, awareness of the existence of SFTS among primary grade teachers in elementary schools participating in ITV broadcast councils will be raised to a minimum level of ninety per cent.

2. Following the broadcasting of SFTS oriented televised lessons, SFTS materials will be available in ninety per cent of the elementary schools participating in ITV broadcast councils.

3. Following the broadcasting of SFTS oriented televised lessons, teachers who utilized the lessons will exhibit a measurably significant increase in the quantity and quality of their science instruction.

4. Following the broadcasting of SFTS oriented televised lessons, children in participating classrooms will exhibit a measurably significant increase in their facility in the use of science processes.

5. Upon the completion of the development and presentation of a series of televised lessons based on SFTS, the developers will have designed a model for systematically applying a wide variety of resources and techniques to the implementation of a new instructional thrust over a regional and statewide area. This model must be sufficiently general to be applicable to other instructional implementation.

Proposed Enabling Objectives

TPO 1. Following the broadcasting of SFTS oriented televised lessons, awareness of the existence of SFTS among primary grade teachers in elementary schools participating in ITV broadcast councils will be raised to a minimum level of ninety per cent.

EO 1-A Gain an awareness of SFTS

EO 1-B Identify SFTS as one available alternative approach to elementary school science.

TPO 2. Following the broadcasting of SFTS oriented televised lessons, SFTS materials will be available in ninety per cent of the elementary schools participating in ITV broadcast councils.

EO 2-A Gain an awareness of SFTS

EO 2-B Send for SFTS materials

EO 2-C Have SFTS materials available

TPO 3. Following the broadcasting of SFTS oriented televised lessons, teachers who utilized the lessons will exhibit a measurably significant increase in the quantity and quality of their science instruction.

EO 3-A Gain awareness of improved techniques of science instruction.

EO 3-B Gain motivation to devote more time to science instruction.

EO 3-C Gain confidence to devote more time to science instruction.

EO 3-D Gain skills to exhibit improved behaviors in science instruction. These skills will include:

1. Teacher questions require students to arrive at an answer by examining and manipulating the materials they are using.
2. Responses are accepted when students use evidence from their lesson activities in observing and responding.
3. Student interpretations are considered acceptable even though often they are partial or temporary conclusions, so long as the evidence and materials of the lesson support the responses.

4. Reasonable time is provided during discussion for observation, thought and reflection.

5. Teacher questions and behaviors emphasize the use of the SFTS processes including observing, classifying, communicating, measuring, inferring and predicting.

6. Teacher questions encourage wider student thought and suggestions for additional investigative behavior.

EO 3-E Exhibit skills in science instruction.

EO 3-F Increase the amount of science instruction.

TPO 4. Following the broadcasting of SFTS oriented televised lessons, children in participating classrooms will exhibit a measurably significant increase in their facility in the use of science processes.

EO 4-A Gain exposure to science processes.

EO 4-B Gain practice in use of science processes. These processes will include elements of:

1. the "Aims for Elementary Science" listed in SCIENCE FOR THE SEVENTIES. Aims 2, 3, 4, 5, 6, 10, and 11 (Clarion edition) are considered particularly appropriate for primary grades.

2. the objectives of the SFTS lessons that are used as a basis for the televised lessons.

TPO 5. Upon the completion of the development and presentation of a series of televised lessons based on SFTS, the developer will have designed a model for systematically applying a wide variety of resources and techniques to the implementation of a new instructional thrust.

EO 5-A Design a model

EO 5-B Test the model

EO 5-C Revise the model

EO 5-D State model in general terms

Tentative Projected Performance Measures

As objectives were written, the following performance measures were projected:

TPO 1. Teachers, when asked to identify available elementary school science resources, will mention SFTS as one of the alternatives.

TPO 2. Schools, when visited and asked if they have SFTS materials available, will be able to demonstrate their availability.

TPO 3. 1. Observation analysis will reveal that teachers are employing desired behaviors.

2. Records of teachers' instructional activities will reveal increased instructional time devoted to science teachers.

TPO 4. 1. Observation analysis will reveal increased student competency in the use of science processes and attainment of aims and objectives of SFTS.

2. A televised test will reveal increased student competency in the use of science processes and attainment of aims and objectives of SFTS.

TPO 5. 1. The model devised will, through meeting the above criteria, demonstrate its effectiveness in implementing SFTS.

2. The model will demonstrate its effectiveness in implementing other instructional thrusts.

FUNCTION 5. SPECIFY METHODS

For each enabling objective, distinct methods were specified. Again, many of these methods are best employed at the time that the television programs are broadcast to the schools. Since this time will be several months after the completion of this project, many of these methods and activities will have to be carried out as project follow-up activities.

TPO 1 - Methods

EO 1-A

Methods:
1. Publicize SFTS through normal science supervisory channels.
2. Publicize SFTS through PDE publication.
3. Publicize SFTS through PSEA publication.
4. Publicize SFTS through PSTA publication.
5. Publicize SFTS through AECT publication.
6. Publicize SFTS through school administration publications.
7. Publicize SFTS through broadcast councils.
8. Provide televised lessons for SFTS.
9. Provide in-service credit program for SFTS using television.
10. Provide station break and spot announcement for SFTS.

EO 1-B

Methods: Methods cited under EO 1-A will all contribute to the attainment of this objective.

TPO 2 - Methods

EO 2-A

Methods: Methods cited under EO 1-A will all contribute to the attainment of this objective.

EO 2-B

Methods: Methods cited under EO 1-A will all contribute to the attainment of this objective. Measures will be taken in all of these instances to call attention of teachers to sources of SFTS materials.

EO 2-C

Methods: Same as indicated in EO 2-B.

TPO 3 - Methods

EO 3-A

Methods:

1. ITV lessons will be designed to lead up to classroom SFTS lessons with emphasis on motivation to pursue the SFTS lesson. When considered appropriate, the ITV lesson will introduce key techniques used in the SFTS lesson.

2. The ITV lesson will be designed so that the classroom teacher is actively involved with the children during the televised presentations in a manner that is consistent with good science instruction. ITV lessons will be designed to establish a triangular interaction between the teacher, the students, and the television presentation.

3. Graphic methods will be used in the teacher's guide to describe appropriate teacher behavior during the television lesson and desirable techniques for science instruction during SFTS lessons.

4. A cueing system will be utilized during the televised lessons to designate appropriate teacher behaviors.

5. A credit in-service program will be developed, utilizing television, to orient teachers to appropriate methods.

EO 3-B

Methods:

1. Motivate teachers to spend more time with science by offering credit in-service training while teachers are on the job.

2. Motivate by presenting SFTS through TV in such a way as to remove fear, hesitation and uncertainty about the teaching of science.

EO 3-C

Methods: Same as for EO 3-B

EO 3-D

Methods: Same as EO 3-A

EO 3-E

Methods: Same as EO 3-A

EO 3-F

Methods: Same as EO 3-B

TPO 4 - Methods

EO 4-A

Methods: 1. ITV lessons will introduce children to processes and to SFTS lessons that will give them practice in processes.

2. Out of school SFTS TV programs will orient children to science processes.

EO 4-B

Methods: Same as for EO 4-A

TPO 5 - Methods

EO 5-A through D

Methods: The model will evolve by carrying out and completing the instructional development project.

FUNCTION 6. CONSTRUCT PROTOTYPE

The primary effort of this project was devoted to accomplishing those activities which related to the design of television programs and the accompanying printed materials for teachers. This was done for two reasons. The first was because these were the specific products called for by the project contract. The second was because these two products are basic to accomplishing all of the objectives that have been prescribed.

Beyond the preparation of the video tapes and teachers' materials, a number of the other designated methods and activities were initiated and carried out to the degree possible prior to actual broadcasting. However, the majority of these procedures will not be possible to complete until the television programs are scheduled for broadcast.

Prototype Development

Therefore, with the focus primarily upon the methods prescribed for enabling objectives 3A, 3B, and 4A, the following procedures were carried out.

Preparation of SFTS Lessons

1. Proposed SFTS lessons were written by SFTS Committee members, teachers and other interested individuals.
2. The proposed SFTS lessons were tested in school situations.
3. Proposed SFTS lessons were brought before the SFTS Committee for possible revision and approval.

Preparation of SFTS-ITV Lessons and Related Materials

1. SFTS lessons were taught in school situations by elementary school science specialists.
2. SFTS lessons were taught by primary grade teachers in their classrooms.

3. Based upon experiences gained under items 1 and 2 above, information was assembled on ways in which teachers who are encountering a SFTS lesson for the first time might be able to use some assistance in technique and procedure to be able to more effectively introduce the lesson.

4. Ideas and information assembled in step 4 were turned over to a script writer who prepared a proposed script.

5. Proposed scripts were submitted to elementary science specialists, television production specialists, science content specialists the Department of Education, and the SFTS Committee for review.

6. Script revisions were made on the basis of feedback from, and discussion with, the reviewers.

7. Television programs were produced.

8. Teacher handbook materials were prepared.

9. Programs and teacher handbook materials were tested by classroom teachers (see Function 7).

10. Programs and teacher handbook materials were reviewed by elementary school science specialists, production specialists, science content specialists, the SFTS Committee and PDE personnel.

11. Revisions were made on the basis of feedback. Such feedback also provided input for future productions.

FUNCTION 7. TEST PROTOTYPE

Television programs and teachers' materials developed in this project were tested informally in a number of situations. These included using the lessons in classrooms in the State College area by the development staff and additional tryout use in the vicinity of Harrisburg by Dr. Roy Allison and Dr. Duane Smith, members of the SFTS Committee.

A more structured testing of the lessons was conducted in the Altoona Schools. As information was fed back from each trial showing, appropriate revisions were made and insights used in the structuring of subsequent lessons.

Data tables referred to in the following description of this testing program can be located at the end of this chapter.

Trial Programs in Altoona

The summary that follows should be interpreted as an observational record rather than as a precise and quantitative experimental design. Any conclusions or inferences from this report must be tempered by the summary nature of the design.

Sample

A decision was made to invite the staff of the Altoona Public Schools to try the ITV programs and evaluate them in real classroom settings. Altoona was selected because of its: 1) closed circuit TV system which serves all elementary schools, 2) proximity to the project headquarters at The Pennsylvania State University, and 3) potential for a large sample.

Telephone conversations with Dr. Ardele Feeley, Assistant Superintendent for Instruction, led to meetings at which the SFTS/ITV Project was described and adopted for trial use. Due to the geographical spread of the elementary schools in Altoona, it was decided that building principals would contact faculty members in their own schools to describe the project and solicit participation. Armed with a short descriptive handout (Appendix A) and a letter of intent to participate (Appendix B), Dr. Feeley and Mr. Harold Yoder, District Coordinator for Science, personally visited each principal to explain the project and deliver explanatory literature. Based upon the discussions of each principal with his faculty, 54 teachers volunteered to use and evaluate four or more of the program/lesson combinations in their classrooms.

To preserve a smooth working relation with the teachers, a clear statement of what was expected of each participant was listed in the last two pages of the descriptive booklet (Appendix A). The minimum time investment for each program/lesson combination was estimated at 80 minutes; the maximum was 210 minutes. In spite of the extra time this added to their workload, 54 teachers volunteered to participate.

In addition to providing basic demographic information in the letter of intent, teachers were asked to state their preference for morning or afternoon viewing and the number (from four to ten) of program/lesson combinations they would view and evaluate. Provided with merely a short title for each program, teachers ranked the lessons they preferred to use from 1 to N where N was the number of programs selected. The ranking information served as the basis for assigning teachers to assure adequate coverage of all programs.

Table 1 summarizes the rank order of preferences for each teacher of

Table 1

first grade (n=29), second grade (n=22) and third grade (n=3). Table 2 summarizes the mean rank and number of teachers assigned to each program/ lesson plan. These figures are reported separately for grades one through three and combined. A low ranking is interpreted as highly desirable for use. For the combined grade levels, the programs most desired were Mystery

Table 2

Boxes, Eyes, Thermometers, and Salt and Water; least desired were Siphons, Light Beams, and Measurement. Third grade teachers also rated Drops highly. All groups rated Siphons and Light Beams low. Perhaps a feeling of lack of familiarity with these topics entered the ranking choice. It should be stressed that teachers rated the programs before they viewed them or had any other information about them, other than the title.

Ten broadcast dates were selected and teachers were assigned according to their stated preferences. Teachers were informed of their assignments by means of a letter (Appendix C). Intended broadcast dates fell on Thursdays, beginning on March 29 and ending on May 31. Programs were aired twice daily at 10:00 a.m. and 1:00 p.m.

Three programs were canceled due to a crucial loss of film by the processing corporation. This also necessitated a rescheduling of some broadcast dates. Table 3 lists the intended and actual broadcast dates. Note that

Table 3

"Investigating Thermometers," "Investigating Measurement," and "Investigating Reflection of Light Beams" were canceled from the schedule.

Teacher Preparation. It is interesting to note that virtually no training of teachers by anyone took place for this project. This lack of training was in part due to a desire of the evaluator to test the self-instructional quality of the teachers manual. Each teacher received a copy of the teachers manual and schedule of assigned programs on Friday, March 23, six days prior to the first broadcast. The only training resulted from the recommended reading of the teachers manual completed by the teacher.

Another indicator of the self-sufficiency of the instructional materials was the amount of assistance requested by the teachers. A toll-free telephone line was established to Drs. Alfke, Shrigley, and Szabo, for the purpose of conferring directly with teachers in the project. To our best knowledge, this service was not used once. Apparently the teachers manual provided a clear picture of the utilization pattern which mitigated against the need for outside consultants. There is some evidence that district personnel were called in to assist; this assistance took the form of supplying needed equipment such as shoe boxes and magnifying lenses.

Data relative to effectiveness of the programs were obtained through two sources. Teachers were asked to complete an Evaluation Questionnaire regarding the use of the SFTS/ITV combinations. Secondly, they consented to being observed during and after the TV broadcast by a trained observer. The information obtained provided suggestions for revisions and improvements as well as indicators of events actually transpiring in the classrooms.

Evaluation Questionnaire

Each participating teacher agreed to complete a questionnaire (See Appendix D) to evaluate each lesson used during the project. A stamped, self-addressed envelope was provided for easy return. The first part of the questionnaire consists of 41 statements about the program/lesson combinations to which the teacher used the following Likert-type response format.

A=strongly agree with the statement
B=agree
C=uncertain
D=disagree
E=strongly disagree

Table 4 contains a summary of responses of teachers to the 41 items; the results are grouped separately for the following lessons: Mystery Boxes, Salt and Water, Siphons, Observation and Description, Eyes, Drops, and Faucets. The right hand column in Table 4 contains a summary of responses for each item across all seven programs. In addition, the number of teachers

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Table 4
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and reliability coefficients for each questionnaire are reported (the same questionnaire was used for each lesson).

Inspection of Table 4 indicates that little variation in teacher responses across the seven programs was evident. The chief index of effectiveness of the series is the overall mean for each item (row mean, right hand column). Based upon the error of measurement of the means, a score of greater than or equal to 3.3 was interpreted as an "Agree" statement; less than or equal to 2.7 indicated a "Disagree" statement.

Ease of Use. The responses suggest that teachers initially felt a bit unsure of how to use the programs: (item 1); interactive television was fun (items 6, 28); programs were appropriate and sufficiently explained in the manual for effective utilization (items 25, 27); and a desire to use the series further was expressed (items 40, 41).

Promotion of Learning. Teacher responses indicated that student learning was promoted by the experience (items 3, 4, 13, 16, 17, 20); teachers felt they acquired useful science background or teaching skills (items 2, 26, 29); and plan (item 19) or attempted (item 26) to use methods or process skills from the programs.

Interest and Appropriateness. Teacher responses suggest the series was not boring to students and presented the right amount of relevent information (items 7, 8).

Technical Quality. The number cues did not detract from the objectives (item 9); blended together well with good examples and appropriate vocabulary (items 10, 11, 12); and the guide was well designed (item 32).

General Effectiveness. The programs were preferred to other modes of instruction (item 21). The majority indicated that the ITV program did a good job in setting the stage for the SFTS lesson (item 24); they were not convinced that the program was absolutely necessary (item 22).

The results of the questionnaire must be considered carefully since the teachers were volunteers for the evaluation. A possible bias in this direction is somewhat supported by the findings that most teachers did not disagree with techniques or goals advocated in the series (item 30); felt that learning by doing is better in science (item 35); and were sufficiently prepared in subject matter to handle the project (item 15).

A final point of interest is that the teachers indicated the teaching skills and processes were somewhat valuable in teaching areas other than science (item 38).

Free Response. Teachers were asked to write their own response to four questions about the use of each program/lesson. The questions asked were:

42. What, if any, was the most difficult part of the program or lesson for you?

43. What, if any, was the easiest part of the program or lesson for you?

44. Did you find it necessary to make any modifications or adjustments to the recommended procedures? If yes, what changes did you make, and did you feel they were more effective?

45. In the space below please write any additional comments, suggestions, or changes which will improve the program, the lesson, or the teachers guide.

Written responses of teachers for each program used were content analyzed (Kerlinger, 1964) to extract the concepts contained in the statements. Appendix E contains a summary of the content analysis for each lesson. The nub of each different response to each of the four questions has been summarized along with the frequency of repetition of that concept by a different teacher.

The content analysis yielded valuable information for revision and updating of programs, lessons, and related materials. The volume of the analysis relegates it to the appendices of this report. A few summary comments are in order, however.

Many concepts occurred with low frequency; these were interpreted as revealing neither major strengths or weakness of the materials.

The issue of locating sufficient quantities of materials for effective student participation was noted, particulary for "Mystery Boxes" and "Salt and Water". Both SFTS lessons required substantial amounts of materials.

Some concern was also expressed that audio-silent times were often too short to "get student's answers".

Teachers observed that obtaining active participation and interest levels during the program were two of the easiest parts of the whole program. The reader is referred to Appendix E for additional details of content analysis of teachers' responses.

Classroom Observation

A scheme for coding verbal behaviors of students and teachers was developed from the Withall and Ribble-Schultz systematic observation instruments. The instrument was used in the observation of selected teachers during and after six of the seven ITV program broadcasts to collect data relative to the use of selected teacher and student verbal behaviors.

The categories selected include ten teacher behaviors and four student behaviors. Table 5 contains the list of categories and brief descriptions

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Table 5

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of each. The first two categories focused upon the teachers' use of reinforcement techniques. Categories three through six classify four common types of questions. Teacher statements which present information to be retained by the student are classified into category seven: informs. Wait time (3 seconds or longer) and disciplinary reproof comprise categories eight and nine respectively. Category ten attempts to identify teacher verbalizations which directly relate to the use of process skills.

Categories 11 through 14 deal with student responses. A voluntary response to a question was coded as 11; a non-voluntary response was identified as 12. An unsolicited question from a student, directed toward either the teacher or fellow students, received a 13. Category 14 is the student counterpart of category 10.

A geographically convenient subset of teachers was observed during the program and the subsequent SFTS lesson and the verbal behavior patterns coded. A total of 30 teachers were visited on the days of the last six broadcasts. Appendix F contains the list of dates, lessons, teachers, schools, grade levels taught, and observer name. No data were available for three of the teachers visited. One was a substitute with no awareness of the program, another teacher had to change her class schedule on the day of the observation, and a third teacher did not use the program that day. In addition, one teacher was visited and coded twice. Three observers with previous training in systematic observational techniques coded the classroom behaviors live, one observer to a classroom.

Verbal Behaviors During ITV

The frequencies of entries in each of the categories during the ITV program are compiled in Table 6 for each teacher. The observational time

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Table 6
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base was uniform across teachers since it was dictated by broadcast time (15 minutes per lesson).

Table 6 includes the total and percentage from each category across all lessons and teachers. A brief inspection of Table 6 shows that the highest

percent of verbal behaviors (31%) occurred in category 11, student volunteering. The second highest percentage (19.2%) was noted in category four, teacher exploration questions. Informing behaviors accounted for only six percent of all verbal behaviors. These data suggest that the interactive ITV program successfully directs teachers and students into a utilization of some behaviors which, by definition, tend to facilitate inductively-oriented classroom environments. In addition, student voluntary participation was enhanced.

The programs apparently failed to lead teachers into the use of more wait times (percentage in category 8 was only 1.1). This observed lack of wait time may be due to the limited amount of broadcast time which is permitted for accepting responses of some 20-30 students. At least two teachers commented to observers that the discussion periods in the program were not long enough to suit their purposes.

Combinations of percentages of behaviors from various categories yield additional insight into the effects of the program. Teacher talk (categories 1-10) accounted for approximately 56 percent of the total behavior observed; student talk (categories 11-14) accounted for 44 percent. The ratio of student to teacher talk during the ITV programs is similar to data from other observational studies which suggest 50 percent teacher talk (Amidon and Hough, 1967). This comparison may be somewhat tenuous in that the latter figures were derived from classrooms where instructional technology was not a dominant factor.

Almost 52 percent of all teacher behaviors observed were questions. This compares favorably with estimates of 30 percent from other studies (Gall, 1970). Surprisingly, only 11 percent of teacher behaviors can be

classified as dispensing information (category 7). Increased use of questions and decreased instances of informing are generally desirable criteria for process-oriented teaching.

The proportion of memory questions (category 3) to total questions was 12 percent; "thinking" questions accounted for 88 percent. Broad-based figures (Gall, 1970) show that teachers typically ask only 20 percent "thinking" questions and 40 percent memory questions.

The percentage of student pursuit questions (those unsolicited by the teacher) remained quite low during (0.4%) and after (1.0%) the program broadcast. Comparative data from a sample of first, second, and third graders (Floyd, 1960) indicates that the percentage of student questions (relative to the total number of questions asked) ranged from 3.6 to 5.1 percent. Based on the ratio of percentages in category 13 to the sum of categories 3, 4, 5, 6, and 13, the figures during the ITV program were 0.1 percent and 3.8 percent after. Although these numbers are small, the implication is that pursuit questions are suppressed by the program and return to expected values afterward. It should also be noted that one teacher (9) accounted for most of the student pursuit questions.

A cautionary note must be inserted at this point. The above data are merely suggestive, since each teacher was not observed sufficiently for high reliability of observations (Medley and Mitzel, 1958). In addition, the teachers who were observed were drawn from a volunteer group in a non-random basis. Finally, the newness of the category system means it has not been tested as thoroughly as might be desired. Overall, however, the results are encouraging.

Verbal Behaviors During SFTS Lessons

One source of evidence of effectiveness of the interactive ITV programs was the verbal behavior patterns of teachers and students during the SFTS lessons taught immediately following the ITV broadcast. The observers remained in the classrooms of Altoona teachers and coded the verbal behaviors. The frequency for each teacher for each of the 14 categories are listed in Table 7, along with the column (category) totals and percentages.

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Table 7

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It can be seen from Table 7 that frequencies for eight of the teachers are missing. The reasons vary from turning the class over to a teacher aide for experience with the SFTS lesson materials (Teacher #1, Salt and Water) to lack of a faucet in the classroom to demonstrate dripping (Teacher #17, Dripping Faucets). Additional reasons for lack of follow-up lessons include: teacher #3 cut off the discussion and stated that the activity would be continued during the next day; teacher #14 was working with another teacher's class identified as low in ability by the teacher and students were directed into another activity by another teacher; teacher #17 conducted no lesson in spite of the apparent interest and questions of the children; teacher #22 stated the lesson was too long for a classroom activity and gave a homework assignment of counting drops for 15 minutes; teacher #25 had a malfunctioning television set and did not plan a follow-up lesson (When the observer arrived, the teacher quickly arranged to move her class to another classroom for the ITV program); teacher #29 did not use the program or the lesson that day; and teacher #30 discontinued the series soon after

the broadcasts began. Additional information on these teachers may be found in Appendices F and G.

Inspection of the frequencies and percentages in Table 7 suggest that the predominent response made was category 11, student volunteering (27 percent). The next highest category was teacher exploration questions (14 percent). These categories also had the highest frequencies during the ITV program, suggesting some immediate carry-over effect.

Informing behavior (category 7) increased from 6 percent during the program to about 12 percent during the SFTS lesson; the percentage of wait time remained the same. This suggests the hypothesis that the ITV program tends to suppress informing behavior but has little or no effect upon wait time.

The percentage of teacher talk behaviors (categories 1 - 10) rose slightly from 56 percent during the programs to 59 percent after. There was a concomitant drop in the percentages of student talk.

Question-asking behavior dropped from 52 percent (of total teacher verbal behavior) during the programs to 44 percent after. Although the drop is eight percent, 44 percent still compares favorably with data reported by Gall (1970) of 30 percent.

It is encouraging to note that the percentage of "thinking" questions (categories 4 - 6) dropped by one percent (from 88 to 87) from ITV program to lesson. It appears that the model questions asked by the narrator in the program and/or suggested by the teachers guide were associated with a substantial short-term transfer.

The observational data collected during the SFTS activities are suspect in the same sense as the data obtained during the program; they may, however, hold additional contamination in that the time base for the observational periods was not uniform. In spite of these shortcomings, sufficient agreement with external findings support the reliability and validity of the data.

The observers made additional notes during the classroom visits and summarized these notes in writing. These summaries are contained in Appendix G of this report. The detail will be left to the reader and some of the major trends from these data will be described here.

Some teachers relied quite heavily on the presence of the teachers manual to guide the ITV interaction while others used it sparingly or not at all. A few teachers did not conduct discussions with students during some of the designated periods but by and large the periods were used appropriately.

Students were less aware of designated discussion periods than teachers. Their enthusiasm was evident in the observation that they often responded to the narrator's questions during non-discussion periods. At least one teacher was observed to continue the discussion into the subsequent audio portions. Student enthusiasm and participation was generally observed to be substantial and numerous teachers commented on this enthusiasm.

The general quality of the productions was high, although some variations were noted.

Summary

Based upon observations, collection of data, and talking with teachers and observers in the Altoona Schools, the following comments appear in order.

Teachers' reception of the idea of teaching with a television program was quite warm. Fifty-four teachers of grades 1, 2, and 3 from the 18 elementary schools of Altoona volunteered to use and evaluate four or more of the ten programs produced. They did so on the basis of a brief five-page brochure which described the series.

Virtually no training in the use of these unique programs was provided for the teachers. Armed only with the Teacher's Manual and a broadcast schedule, they apprehensively plunged in and found it to be an easy approach to use. One program was used by a substitute teacher with little prior knowledge of the program.

A variety of strategies were employed in conjunction with the ITV programs. Some teachers simply turned on the TV; others devised brief introductory talks or demonstrations to prepare the children. Most teachers began discussion periods on cue; some were seemingly not "tuned in" to proper utilization of these periods. Some used the teachers guide; others simply winged it. Some teachers improvised to involve students; one teacher brought out manipulative materials during discussion sessions. Teachers frequently observed that the programs were quite effective at generating student discussion and participation. Students often generated discussion and made comments or raised questions which carried into subsequent "viewing" sessions; their enthusiasm in some cases couldn't be dampened by the ringing chime which signalled the end of the discussion period.

Teacher flexibility was evident during the activities immediately following the TV program. A few teachers quickly directed students to a different activity. Others summarized and stated that there would be further science activity during the next day, presumably during "science". The majority of teachers moved directly into some related activity. Some discussed the program topic and further extended its range. Others had students launch into individual sensory experiences with their own set of materials. One teacher, faced with no sink in her room, performed an admirable simulation of a dripping faucet using a syringe and colored water. Some teachers eventually completed all the suggested follow-up activities; others used some activities selectively. Each program was broadcast twice daily. At least one teacher watched the morning broadcast in preparation for its afternoon use.

The chief objection to the lessons was the amount of apparatus needed to conduct the follow-up activities. Both the Assistant Superintendent and Science Supervisor were pressed into service to provide needed equipment. Two teachers in one school did not use any programs after the first broadcast. The chief reason they cited in a letter of explanation was that they did not wish to emphasize that much science and the science they did emphasize tended to follow a seasonal theme.

The amount of question-asking behavior during the program and during the lesson seems to be well above national averages. A noticeable de-emphasis on telling information behaviors was evident.

Some technical flaws in the programs were spotted by teachers but were not identified as being severe. "Mystery Boxes" had morning broadcast

interference which cleared up in the afternoon. The drops and their sounds were not always synchronized in "Drops." (Note: Tapes used in the Altoona trial lessons were in pilot form, subject to subsequent synchronization and editing. All such "technical flaws" associated with the tapes were corrected in the course of the normal completion of production.)

Overall, the programs have had a most desirable impact on science teaching practices in Altoona teachers from a vast range of schools. Most gratifying was the response that the series seemed to heighten the teachers' interest in teaching science, rather than causing an "avoidance" reaction.

TABLE 1

RANK ORDER[1] PREFERENCE FOR ITV PROGRAMS BY TEACHERS

FIRST GRADE

Teacher #	Program[2]										
	1	2	3	4	5	6	7	8	9	10	*
1	2	7	9	1	3	4	6	5	8	10	4
2	4	8	10	5	3	2	7	6	1	9	10
3	2	6	10	8	3	4	7	9	1	5	7
4	4	3	9	8	5	1	7	6	2	10	5
5	4	4	10	3	2	9	6	8	7	5	4
6	3	9	8	1	7	6	4	5	10	2	6
7	2	1	-	-	-	3	-	4	-	-	4
8	4	2	9	1	8	3	6	5	7	10	10
9	2	1	10	5	3	4	8	7	6	9	8
10	7	6	4	2	8	9	3	5	10	1	6
11	1	3	8	10	2	4	7	6	5	9	6
12	1	5	9	10	2	3	8	4	6	7	6
13	3	9	10	2	1	7	5	4	6	8	10
14	1	3	4	2	7	10	5	9	8	6	4
15	2	4	10	1	6	3	8	7	5	9	8
16	-	4	-	-	-	-	4	3	2	-	4
17	4	2	10	5	3	1	5	7	8	9	8
18	1	3	6	8	2	5	7	4	10	9	8
19	2	-	-	-	4	6	1	3	-	5	6
20	7	3	5	-	6	1	4	2	-	8	8
21	5	1	8	2	4	3	7	6	9	10	10
22	1	4	-	-	2	3	-	-	-	-	4
23	2	5	8	7	3	1	4	6	9	10	6
24	4	1	5	8	10	2	6	3	7	9	4
25	1	2	7	10	4	3	5	6	8	9	4
26											10
27	These four teachers chose										10
28	ten and did not rank the										10
29	programs.										10

SECOND GRADE

Teacher #	Program[2]										
	1	2	3	4	5	6	7	8	9	10	*
1	4	6	9	1	7	8	3	5	2	10	6
2	1	5	9	2	8	10	6	3	7	4	4
3	6	3	8	10	1	2	5	4	7	9	4
4	1	6	9	10	3	4	2	5	8	7	4
5	4	5	8	1	2	9	7	6	3	10	10
6	7	3	9	10	2	6	5	4	8	1	4
7	6	2	10	9	1	4	7	3	8	5	8
8	8	9	3	6	2	1	5	4	7	10	8
9	1	6	7	5	9	2	10	8	4	3	6
10	5	3	8	4	1	2	9	10	7	6	4
11	2	7	10	1	9	6	5	3	8	4	6
12	2	5	6	7	3	1	8	9	4	10	6
13	8	9	3	6	2	1	5	4	7	10	8
14	-	5	4	-	-	-	2	3	-	-	5
15	2	4	-	-	1	3	-	-	-	-	4
16	2	-	-	1	3	4	-	-	-	-	4
17	5	1	10	4	6	2	7	8	9	3	10
18	2	-	-	-	-	1	-	4	3	-	4
19	-	1	-	-	4	2	-	-	-	3	4
20	5	4	9	10	3	1	8	2	7	6	6
21	8	9	3	6	2	1	5	4	7	10	8
22	9	4	10	7	3	2	5	6	1	8	4

THIRD GRADE

Teacher #	Program[2]										
	1	2	3	4	5	6	7	8	9	10	*
1	1	3	10	7	5	6	8	2	4	9	10
2	1	6	8	10	5	2	3	7	4	9	5
3	1	9	5	10	3	6	4	2	7	8	10

[1] 1= highest rank, etc.
[2] See Table 3 for list of Program Names

* Denotes the number of programs each teacher was willing to evaluate.

TABLE 2

MEAN RANK OF PREFERRED NUMBER OF PROGRAMS
SELECTED BY ALTOONA TEACHERS (1 = Highest, etc.)

First Grade										
Program [1]	1	2	3	4	5	6	7	8	9	10
Mean Rank	2.8	4.0	8.1	5.0	4.4	4.2	5.7	5.4	6.4	7.7
Number of Teachers Assigned	27	26	9	17	23	25	18	21	12	9

Second Grade										
Program	1	2	3	4	5	6	7	8	9	10
Mean Rank	4.2	4.9	7.1	5.6	3.6	3.4	5.8	5.0	5.9	6.6
Number of Teachers Assigned	17	14	7	11	16	18	10	14	10	9

Third Grade										
Program	1	2	3	4	5	6	7	8	9	10
Mean Rank	1.0	6.0	7.7	9.0	4.3	4.7	5.0	3.7	5.0	8.7
Number of Teachers Assigned	3	2	2	2	3	3	3	2	3	2

Combined Grades										
Program	1	2	3	4	5	6	7	8	9	10
Mean Rank	3.3	4.5	7.6	5.5	4.0	3.9	5.3	5.1	6.1	7.3
Number of Teachers Assigned	47	42	18	30	42	46	31	37	25	20

[1] See Table 3 for Program Names

TABLE 3

BROADCAST SCHEDULE FOR ALTOONA SCHOOLS

(10:00 a.m. and 1:00 p.m.)

	Program	Intended Broadcast Date	Actual Broadcast Date
1.	Investigating Mystery Boxes	3/29/73	3/29/73
2.	Investigating Salt and Water	4/5/73	4/5/73
3.	Investigating Siphons	4/12/73	4/12/73
4.	Investigating Observation and Description	4/19/73	4/26/73
5.	Investigating Eyes	4/26/73	5/10/73
6.	Investigating Thermometers	5/3/73	Cancelled
7.	Investigating Dripping Faucets	5/10/73	5/17/73
8.	Investigating Drops	5/17/73	5/24/73
9.	Investigating Measurement	5/24/73	Cancelled
10.	Investigating Reflection of Light Beams	5/31/73	Cancelled

TABLE 4

SUMMARY OF RESPONSES OF TEACHERS TO ITEMS 1-41 ON
SFTS/ITV EVALUATION QUESTIONNAIRE; SEPARATE PROGRAM DATA

RESPONSE KEY

(A) means you strongly agree with the statement
(B) means you agree
(C) means you are uncertain
(D) means you disagree
(E) means you strongly disagree with the statement

ITEM	Mystery Boxes	Salt and Water	Siphons	Observation and Desc.	Eyes	Drops	Faucets	Row Mean
1. I was often unsure of what, exactly, I was supposed to be doing during the ITV program.	2.6	2.5	2.3	2.0	2.5	2.0	2.1	2.3
2. After using the program, *I felt that I had learned* either important background knowledge about science or valuable teaching skills.	3.9	3.9	4.2	3.4	3.8	3.8	3.8	3.8
3. The topics presented in the program are a valuable aid to help students to investigate science.	4.3	4.4	4.4	4.3	4.4	4.1	4.6	4.4
4. The student reactions (questions, statements, etc.) during the program were such that the program did not achieve its objectives.	1.9	1.9	2.2	2.0	2.1	1.7	1.7	1.9
5. The students became bored watching the program.	1.7	1.7	1.8	2.5	1.8	2.0	1.6	1.9
6. Teaching with the program was fun.	4.2	4.2	4.2	3.9	4.2	4.2	4.3	4.2
7. Too much information was presented to the children in a short time.	1.8	1.8	1.8	1.9	1.8	2.1	1.5	1.8
8. There was much irrelevent information in this program.	1.8	1.8	1.6	1.9	1.8	2.1	1.7	1.8
9. Frequent use of the numbe. cues on the TV screen detracted from the objectives.	2.5	2.3	2.1	1.8	2.3	2.2	1.9	2.2

TABLE 4 continued

	Mystery Boxes	Salt and Water	Siphons	Obser. and Desc.	Eyes	Drops	Faucets	Row Mean
10. The program had serious gaps and did not blend together well.	1.7	1.6	1.6	1.7	1.9	2.1	1.6	1.7
11. The examples used in the program to illustrate the main points were excellent.	4.2	4.3	4.2	3.9	4.2	4.3	4.6	4.2
12. The vocabulary contained many unfamiliar words. Students often did not understand what was going on.	1.8	1.8	1.7	1.8	2.0	1.7	1.5	1.8
13. The idea of using an interactive television program to promote science learning is a waste of time.	1.6	1.6	1.5	1.7	1.8	2.2	1.3	1.7
14. I felt I was "put on the spot" by discussion breaks in the ITV program.	1.7	1.6	1.7	1.9	1.9	2.4	1.6	1.9
15. I have sufficient subject matter preparation to enable me to teach this lesson.	4.2	4.3	3.8	4.3	4.0	3.8	4.3	4.1
16. The lesson was well organized with concepts highly related to one another.	4.2	4.2	4.3	4.1	4.2	3.9	4.4	4.2
17. At the end of the lesson, students based many of their conclusions on evidence uncovered during the lesson.	3.7	3.9	3.9	3.9	3.9	4.1	4.3	4.0
18. I would volunteer to try out future lessons that SFTS publishes.	4.1	3.8	4.2	4.2	4.1	4.0	4.3	4.1
19. I plan to use more of the teaching methods (for example, questioning, wait-time, etc.) from the program/lesson combination in my teaching.	4.0	4.1	4.3	4.0	4.1	4.0	4.3	4.1

TABLE 4 continued

	Mystery Boxes	Salt and Water	Siphons	Obser. and Desc.	Eyes	Drops	Faucets	Row Mean
20. I believe the students learned a lot, considering the amount of time spent on the program and lesson.	4.2	4.1	4.2	3.7	4.2	4.2	4.3	4.1
21. I prefer the interactive televised program and follow-up lesson to a textbook, workbook, or televised demonstration.	3.9	4.0	4.1	3.9	4.0	4.2	4.2	4.0
22. The program would not be useful without the follow-up SFTS lesson.	3.5	3.3	3.6	3.3	3.3	3.2	3.2	3.3
23. After completion of the program/lesson combination, I was favorably impressed with and more interested in the general subject matter than before.	4.2	4.0	4.2	3.5	4.0	4.1	4.0	4.0
24. The ITV program provided an admirable job of setting the stage for the subsequent SFTS lesson.	4.4	4.4	4.3	3.9	4.0	4.4	4.4	4.3
25. Some advanced training in how to use the programs and lessons would probably have made this a better learning experience.	3.5	3.5	3.7	2.7	3.4	2.9	3.0	3.2
26. I attempted to get students to use some of the process skills (for example, observing, measuring, classifying, etc.) from the program later when I taught the lesson.	4.5	4.2	4.2	4.3	4.3	4.4	4.3	4.3
27. I would have liked to ask questions (via telephone or in person) of a SFTS representative before I used the program or lesson.	3.3	2.6	2.4	2.3	2.1	2.5	2.5	2.5
28. I believe the adjustment to this mode of instruction could be made easily; teaching this way would be enjoyable.	3.9	4.1	4.4	4.3	4.2	4.2	4.2	4.2

TABLE 4 continued

	Mystery Boxes	Salt and Water	Siphons	Obser. and Desc.	Eyes	Drops	Faucets	Row Mean
29. I have a better understanding of the processes of science (and how to teach them) after using this program/lesson combination.	3.7	3.9	4.1	3.6	3.8	3.9	3.8	3.7
30. I disagreed with at least one of the teaching techniques or SFTS goals advocated in the program or lesson.	2.2	2.0	1.9	2.2	2.4	2.3	2.1	2.2
31. When I taught science in the past, my emphasis has been more oriented toward learning science facts or concepts than toward science processes skills such as observing, measuring, classifying.	3.0	3.1	3.5	2.7	3.3	3.4	3.2	3.2
32. The teachers guide was well designed, making it easy to follow instructions and lead discussions.	3.9	3.8	3.3	4.0	3.6	3.8	3.7	3.7
33. I feel satisfied that I used the materials in the manner in which they were intended to be used.	3.9	3.9	3.4	4.2	3.8	3.9	4.4	3.9
34. I understood the teachers guide better after I taught the program and lesson than after I simply read it over.	4.3	3.9	3.8	3.7	3.9	3.9	3.7	3.9
35. Students learn science better by doing things with science than by reading about or listening to someone tell about science.	4.7	4.7	4.8	4.7	4.6	4.5	4.7	4.7
36. The teachers guide proved valuable direction to help me conduct the program.	4.3	4.2	3.1	4.1	4.0	4.1	4.2	4.0
37. During the lesson, I consciously tried to use some of the teaching techniques illustrated in the ITV program.	4.4	4.2	3.9	4.5	4.5	4.3	4.4	4.3

TABLE 4 continued

	Mystery Boxes	Salt and Water	Siphons	Obser. and Desc.	Eyes	Drops	Faucets	Row Mean
38. The teaching skills and learner processes are of limited value in teaching areas other than science.	2.4	2.0	1.9	2.4	2.4	2.5	2.1	2.2
39. I expect to incorporate some SFTS lessons in my science lessons next year.	4.3	4.2	4.4	4.2	4.1	4.2	4.4	4.3
40. When the complete ITV series is broadcast in the future, I expect to use it as an aid to inservice professional improvement.	3.8	3.9	4.2	3.9	4.0	3.9	4.0	4.0
41. I would recommend this way of teaching science to my fellow teachers.	4.2	4.2	4.4	4.5	4.3	4.4	4.5	4.4
Number of respondents per program questionnaire	37	30	12	15	24	17	19	
Coefficient Alpha reliability	.74	.64	.67	.79	.76	.76	.38	

TABLE 5

VERBAL BEHAVIOR CATEGORY SYSTEM
USED IN COLLECTION OF OBSERVATIONAL
DATA WITH ALTOONA TEACHERS

Numerical Code	Title	Descriptor and/or Examples
1	Learner Supportive	Praise, encourage, bolster the student
2	Clarification	Help students gain insight into a proglem: "I can understand why you said that", "You said you can measure the box", "By that, you mean the length of it",
3	Question-Memory	"How many boxes do you see on the screen?"
4	Question-Exploration	"What else did you observe?"
5	Question-Pursuit	"What is the reason (evidence) for your answer?"
6	Question Predict/Infer	"What would happen if we tipped the box?" "How could we find out how many things are in the box?"
7	Inform	"There are three ping-pong balls in the box."
8	Wait time	Teacher pauses before accepting student response (minimum time = 3 seconds)
9	Reproof	Teacher admonishes student for unacceptable behavior.
10	Process	Teacher evidences personal use or mention of skills of measuring, classifying, interpreting data, inferring, predicting, etc.
	Teacher statements in categories 1-9 which include process were coded doubly. "What else did you observe?" Would be coded as 4(10).	
11	Volunteer	Student volunteers answer to teacher or student question.
12	Complies	Student answers but does not volunteer.
13	Pursuit	Student asks a question of teacher or classmates.
14	Process	Same as #10 above, except student is speaking.
	Student statements in categories 11-13 which include process were coded double. "How can we measure that?" Would be coded as 13(14).	

TABLE 6

SUMMARY OF VERBAL ANALYSIS OF
SELECTED ALTOONA CLASSROOMS DURING
ITV PROGRAM

Teacher #	Supportive	Clarification	Memory Q	Exploration Q	Prediction Q	Pursuit Q	Informing	Wait Time	Reproof	Process	Volunteer	Compliance	Pursuit	Process
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	10	4	1	8	1						17			
2	3	7	3	15	1	2	2	1	1	3	17	1		
3		3	1	3		1	1	1			46	1		
4	4	10	4	9		1				3	2	28		
5	5			19	1	4	3			10	23			
6			3	10	2	5	1			8	18	1		3
7	2		1	5	7	1			2		7	6		4
8	5	5	1	12	4			4	1	9	25			
9	4	7		19	2		5	3	2	3	24	7		28
10	3	5		24					6	8	14	8		15
11	4	3		22	1	1	4		3	4	18	4		
12	12	2		20	5		2		1	1	28		1	1
13	4	7	1	23	3	1	3				28			1
14	12	2		10	1		4			2	27			
15	4	8		21	2	1	10			5	24	2		
16	6	3	1	24	2	3	12	3		12	15	8		2
17	4	9	1	11	5	1	5	4	1	5	12	4		13
18	3	9	1	12	5	3	1	1	1	14	14	5		14
19	1	4		23	4		1			1	28			1
20	2	9	1	10	1	2	1		1	5	29			
21	21	2	14	9	6	7	18	1	2	4	33		2	33
22	4	5	2	9	4	1	6			5	20			17
23	10		13	12	11	3	15				43		4	
24	6		7	5	1	3	2				21			
25	3	1		20		1	4	3	1	2	17			
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	12	3	2	12	5	1	10			7	27		1	43
28	2	3	9	8	6		6				23			
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	146	111	66	374	80	42	116	21	22	111	604	75	8	175
%	7.5	5.7	3.3	19.2	4.1	2.2	6.0	1.1	1.1	5.7	31.0	3.9	0.4	9.0

TABLE 7

SUMMARY OF VERBAL ANALYSIS OF
SELECTED ALTOONA CLASSROOMS FOLLOWING
ITV PROGRAM

Teacher #	Supportive	Clarification	Memory Q	Exploration Q	Prediction Q	Pursuit Q	Informing	Wait Time	Reproof	Process	Volunteer	Compliance	Pursuit	Process
	1	2	3	4	5	6.	7	8	9	10	11	12	13	14
1*														
2		2	3	9		2	11			4	9			
3*														
4	1	4		6			4		2	3	4	5		
5	1		3	8		4	2				13			
6	2		2	4			2	2		1	3	2		1
7	6	8	1	3	5	1			7	5	13	6		
8	2			3						1	6			
9	9	18		10	8	1	15	1	4	16	31	1	24	48
10	13	13		7	2	3	5	1	4		30	1	4	21
11	2	2		17	2		6	2	1		19	4	3	4
12	17			33			7		1	2	33	8		
13	7	7	6	20	2	6	26				27	4	6	6
14*														
15	1		3	1			2	2			2			
16	6	1	1	21	4	2	13	3	4	5	16	6		
17							2	1						
18	16	6	1	4	1	6	9		1	8	17	6		15
19*														
20	2	2	1	18	1		13		3	2	22		1	1
21	15	2	4	12	5	10	4		1	4	32	2		35
22*														
23	31	1	10	9	3	13	31		2		54	1	4	
24	14	2	9	7	3	20	28		1		43	1		
25*														
26	2			18	2	3	6	3			18	1		
27	4	6	4	11	5	7	6	3		11	33	2		42
28	5	1	9	9	1	1	11				19		1	
29*														
30*														
Totals	156	75	57	234	44	89	206	18	31	64	446	50	13	173
%	9.4	4.5	3.4	14.1	2.7	5.4	12.4	1.1	1.9	3.9	26.9	3.0	1.0	10.5

* No coding for a variety of reasons (see text)

FUNCTION 8. ANALYZE RESULTS

The analysis of the results of testing the television and handbook materials in the Altoona schools is detailed under FUNCTION 7 and can be referred to in that chapter. In this section, we will deal with the reaction of individuals and groups to the television programs, teacher handbook, and the results of the testing procedures in Altoona.

PPTN-ITV Advisory Committee

On September 12-13, 1973 the Instructional Television Advisory Committee of the Pennsylvania Public Television Network met at University Park, PA with the project staff. Television programs were viewed, printed materials were inspected, a report was presented on the Altoona testing, and considerable discussion was held. Based on the recommendations of this group, the teacher orientation programs were subsequently revised. At the end of the meeting, each participant was asked to write a letter indicating his reactions to the product of the project. Copies of these letters are compiled in Appendix H. Inspection of these letters would seem to support the conclusion that the PPTN-ITV Advisory Committee has approved the materials produced and supports implementation of the SFTS-ITV thrust.

SFTS Committee

On October 9, 1973, the Science for the Seventies Committee met at University Park, PA with the project staff. Television programs were viewed, printed materials were discussed and a report was presented on the Altoona testing program. One recommendation was put forth for a television program revision which was subsequently made. The meeting closed with the approval of the project by the Committee.

PSU Science Content Specialists

Throughout the project, Dr. George Shoffstall representing the College of Science and Dr. Philip Becker representing the College of Earth and Mineral Sciences at Penn State have been monitoring the science content of the materials. In a meeting on October 24, 1973 they provided their endorsement of the project.

FUNCTION 9. IMPLEMENT/RECYCLE

Having fulfilled the enabling objectives relative to preparation of television programs and related materials and having gained preliminary evidence to indicate the validity of these resources, the stage is now set for statewide implementation. This will occur in about a year, in the fall of 1974.

In preparation for this wide scale implementation, a number of activities are scheduled which will meet the remainder of the long range objectives.

Publicity

An extensive publicity campaign is being carried out. Presentations relative to the SFTS-ITV materials have already been scheduled at such professional association meetings as:

Pennsylvania Science Teachers Association
Pennsylvania Learning Resources Association
Pennsylvania Association for Supervision and Curriculum Development
Association for the Education of Teachers of Science
National Science Teachers Association
National Association of Educational Broadcasters
National Association for Research in Science Teaching

Not only are presentations planned at the meetings of these organizations but also publications in the journals of these and other appropriate societies.

As the date approaches for statewide broadcast, extensive publicity will be distributed through public media channels.

Teacher Orientation and Training

A number of avenues are being developed to accomplish teacher orientation and training. These include in-service training through broadcast

councils, intermediate units, in-service councils, school districts, schools, and colleges and universities. Special television programs were developed as part of this project for the purpose of orientation through broadcast television.

Procedures are being explored to arrange for ways in which teachers can gain certification credit through their work with SFTS.

A Model for Statewide Instructional Change

By the fall of 1974, all activities involved in this effort will be summarized as a model for implementing future instructional thrusts.

SFTS-ITV MATERIALS

The major emphasis of this report has been upon the development of the philosophy and processes necessary to implement statewide instructional change in primary grade science. Essential tools in this implementation are the materials prepared as a product of the project. These materials, which are being submitted with this report, exist in two forms. One is television video tapes and the other is an accompanying ITV utilization handbook for teachers.

SFTS-ITV Video Tapes

A total of two hundred and ten minutes of video taped ITV programming has been produced during this project. Two half-hour programs were prepared to orient primary grade teachers to Science for the Seventies and the use of television in relation to SFTS. Ten fifteen-minute programs were prepared in such a way as to provide teachers with assistance in processes, strategies, and techniques for more effectively teaching SFTS lessons following the programs. The titles of the programs are indicated below.

Teacher Orientation Programs

An Introduction

The Development

Programs for Primary Grade Classroom Use

Investigating Mystery Boxes
Investigating Eyes
Investigating Dripping Faucet
Investigating Drops
Investigating Salt and Water
Investigating the Thermometer

Programs for Primary Grade Classroom Use (cont'd.)

Investigating Observation and Description
Investigating Siphons
Investigating Reflection of Light Beams
Investigating Measurement

SFTS-ITV Handbook for Teachers

The SFTS-ITV Handbook stresses the importance of SFTS lessons, the television programs, and six teaching strategies in the Handbook as links between the teacher and children in facilitating effective science instruction.

The Handbook is somewhat unique in that it provides detailed information about instructional strategies that the teacher can use with his or her class during the television programs. After guiding the teacher in the use of these strategies during the programs, the teacher is encouraged to continue to employ these desirable strategies while conducting the subsequent SFTS lessons. The resulting purpose of the use of the handbook with the television programs is not only to help children learn science but also to assist teachers to become more effective in their science instruction. It is anticipated that this assistance to teachers might also provide strategies that will contribute to their general instructional effectiveness.

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APPENDIX A

AN INTRODUCTION TO:
TELEVISED INTRODUCTION TO
SCIENCE LESSONS

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AN INTRODUCTION TO:

Televised Introduction to

Science Lessons

from

SCIENCE FOR THE SEVENTIES

Developed for

THE PENNSYLVANIA DEPARTMENT OF EDUCATION
and

WPSX-TELEVISION

HAVE YOU EVER.....

TEAM-TAUGHT with a television program?

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or

USED a television program to introduce a student-oriented science lesson?

or

Heard of Science for the Seventies?

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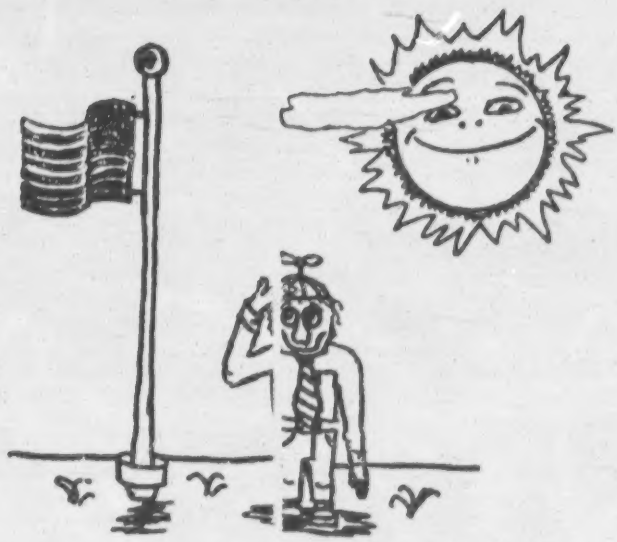
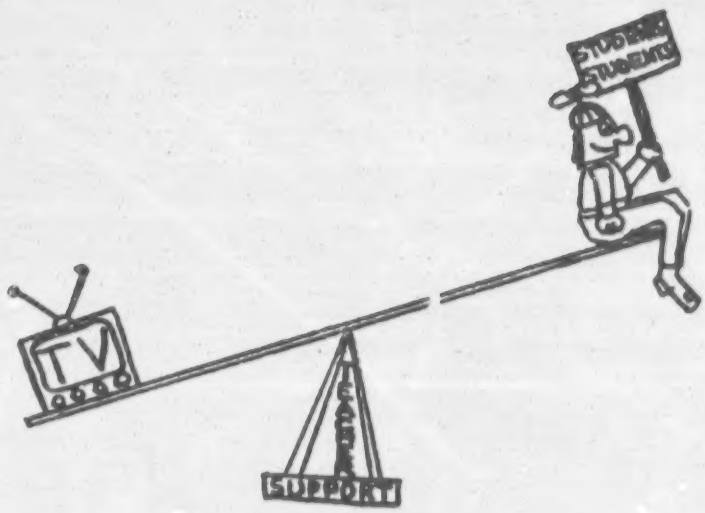
Now that we have your

ATTENTION.....



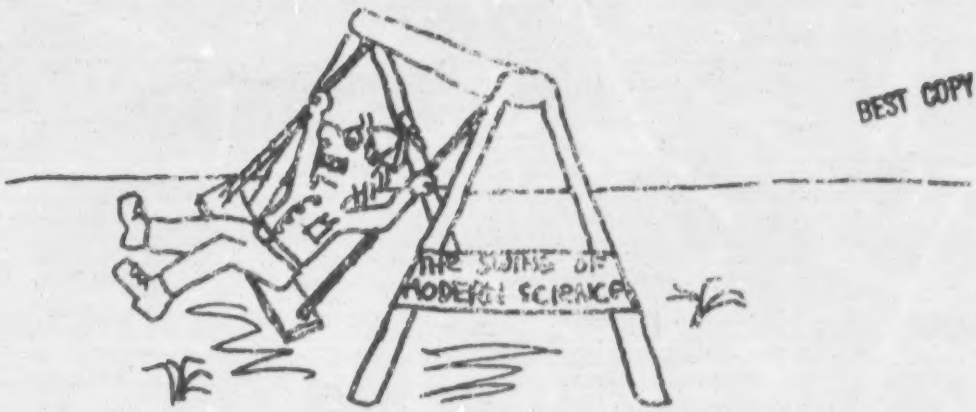
We would like to have your

SUPPORT!!!!!!!!



But first, this commer:ial message!

The Pennsylvania Department of Education has developed materials and lessons to help elementary school teachers get into the swing of modern science instruction. And of course, they called it Science for the Seventies!



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SFTS provides background information and a variety of lessons which are examples of the most up-to-date methods of teaching science. The SFTS lessons are designed to be performed with:

1) a minimum of scientific training and class preparation, and
2) common materials readily available to the teacher (except for the 30,000 volt Framistan which can be purchased separately)

SFTS aims to help children grow in many areas, including such areas as:

1) measuring with English units and metric units to determine length, area, volume, and weight.
2) formulating and asking questions of his environment as part of his efforts to describe, clarify, and analyze the problem.

ETC....

In addition, SFTS aims to help teachers use latest teaching methods, such as:

1) teacher questions which require students to examine and/or manipulate materials they are using for an answer.
2) including reasonable time for thought and reflection for observations, questions, and responses.

ETC....

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BUT...since Pennsylvania is so LARGE, and elementary teachers so NUMEROUS, and science supervisors so FEW (albeit dedicated and knowledgeable) television is a valuable means of helping you keep up with the rapidly changing world of science teaching.

The TV programs designed to promote these goals and spread the word must be tested to see how <u>well</u> they work. You can help by using and evaluating some of these lessons. Your reactions will help us to determine where program revisions need to be made to better achieve the objectives. This is where YOU come in!

We would like you to use some of these TV programs with your existing science program and students in the privacy of your classroom and tell us what you think of them.

What is unique about These TV Programs?

First, they are "taught" with you as an <u>active</u> participant (Team-Teaching). Don't let this scare you. The programs are easy to work with-just different.

You see, most TV programs are structured as a meth d of interaction with students. Most of the time, it's a one-way communic tion.

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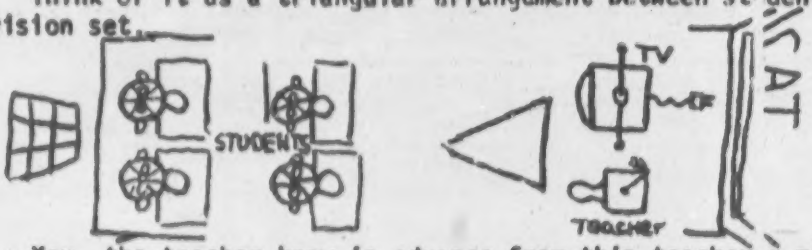
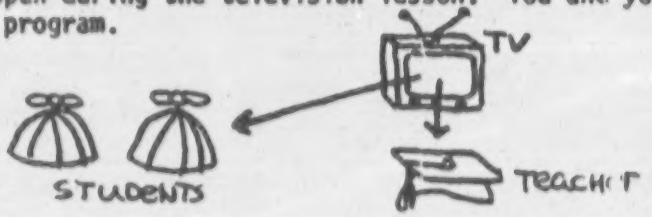
Sometimes, it operates with some response from the studen s.

Well, the thing that is different about these SFTS television programs is that the television set is not the central feature dur ng the TV program. You, the classroom teacher are! Here is how it works.

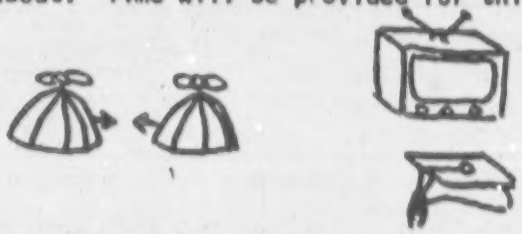
Think of it as a triangular arrangement between st dent, teacher, and television set.



You, the teacher know in advance from this teacher s manual just what is going to happen during the television lesson. You and your students view the television program.



At times, things will happen on the television set that students will want to talk about. Time will be provided for this to ha pen.



Sometimes, things will happen on the television se that students and teacher will want to discuss. Time will also be prov ded for this.

Second, the television programs are not lessons. The actual lessons are described in the teacher's guide. The TV programs will assist you to introduce the lesson and call attention to key ideas and techniques which are part of the lesson. In short, the TV programs will provide a transition into SFTS lessons and help call your attention to some of the things you can do to successfully carry out the SFTS lessons.

Third, these programs, which come with a thorough easy-to-read teacher's guide, are not designed to replace your existing curriculum. Rather, they are designed to help you teach science the modern way, regardless of the curriculum you are presently using.

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How can you help?

You can help by agreeing to use some or all of these TV programs and associated SFTS lessons with your students during the remainder of the present school year. Simply express your interest and you're on!

You will be provided with a broadcast schedule and a teacher's guide which includes a description of the program and suggestions for your role during the program. The guide also includes the follow-up SFTS lesson descriptions. On-the-spot questions will be handled by making a member of the SFTS committee available by telephoning consultation should you have specific questions.

How many programs and lessons are there? (how much work?

While the series contains 10 programs and related lessons, we ask that each primary grade teacher agree to use any 4 of the TV program/SFTS lesson combinations. This involves very little extra work, as we see it from our biased point of view. To permit you a fair estimate, however, look at the activities and suggested times as follows.

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For each TV program,

1) preparation time is about 15-30 minutes, actual TV viewing time is 15 minutes.
2) teaching the follow-up SFTS lesson involves preparation time of from 20-60 minutes, actual lesson from 20-60 minutes.
3) completion of a brief multiple-choice opinion assessment of the effectiveness of the program/lesson combination in your teaching situation. (15-30 minutes).
4) be willing to have an observer (pre-announced) visit your classroom during a TV program broadcast to observe the effect of the program on children. It is the program that is being evaluated not you or your students.

Your participation carries the guarantee that the results of your use and evaluation of the materials will not be released to anyone without your written consent.

Although the SFTS lessons have been tested with teachers and students in many Pennsylvania classrooms, the use of the TV programs to introduce teachers and students to the lessons is a new and partially tested venture. Your honest evaluation of this pilot project will be most valuable as a basis from which to make changes, revisions, and additions during the summer of 1973, prior to actual public broadcasting.

How will the programs be scheduled?

The plans call for the broadcasting of one program per week in the morning and again in the afternoon for 10 weeks. The first program is scheduled to begin during the last week in March. All necessary materials and schedules will be distributed to your school mailbox in time to give you adequate preparation time.

APPENDIX B

LETTER OF INTENT

SCIENCE FOR THE SEVENTIES INSTRUCTIONAL TV PROJECT

Yes, I plan to participate in this project.

1) Name _____

2) School Name/ Telephone Number _____

3) Grade level taught (circle one) K 1 2 3

4) Room number _____

5) Broadcast preference (morning or afternoon)

6) Circle the number of program/lesson combinations you prefer to use

4 5 6 7 8 9 10

You are perfectly welcome to view more lessons than the number you circled. Contact the person listed below for additional evaluation forms.

7) Listed below are the names of the program/lessons to be broadcast. We will make lesson assignments to insure adequate coverage of each lesson, but will also try to honor your preferences. Please indicate your first lesson choice by placing 1 in the appropriate blank, 2 in the blank of your second choice, etc., until all 10 choices are completed.

___Investigating Mystery Boxes
___Investigating Eyes
___Investigating The Dripping Faucet
___Investigating Siphons
___Investigating Drops
___Investigating The Thermometer
___Investigating Measurement
___Investigating Reflection of Light Beams
___Investigating Salt and Water
___Investigating Observation and Description

Thank you for your cooperation. For further information contact:

Dr. Michael Szabo
Evaluation Director
177 Chambers Building
University Park, PA 16802
814-865-2161

APPENDIX C

SCIENCE FOR THE SEVENTIES

INSTRUCTIONAL TELEVISION PROJECT

PROGRAM ASSIGNMENTS FOR ALTOONA

Teacher's Name _____

School _____

Based upon your stated preference and the number of lessons you indicated you would use, you have been assigned to the program/lesson listed below:

	Programs	Broadcast Date
_____	Investigating Mystery Boxes	3/29
_____	Investigating Salt and Water	4/5
_____	Investigating Siphons	4/12
_____	Investigating Observation & Description	4/19
_____	Investigating Eyes	4/26
_____	Investigating Thermometers	5/3
_____	Investigating Dripping Faucets	5/10
_____	Investigating Drops	5/17
_____	Investigating Measurement	5/24
_____	Investigating Reflection of Light Beams	5/31

Broadcast times are 10:00 a.m. and 1:00 p.m. each Thursday.

APPENDIX D

QUESTIONNAIRE ON SFTS/ITV PROJECT

QUESTIONNAIRE ON SFTS/ITV PROJECT

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Please complete and return this form within 2-3 days of using the ITV program and SFTS lesson. Send both the Questionnaire and Answer Sheet to the Director of Evaluation using the stamped, self-addressed envelope provided.

Directions:

1. Complete the following:

   a. Your Name_____(Name may be omitted)

   b. School _____

   c. Grade Level _____

   d. Title of Lesson _____

   e. Today's Date _____

2. Print only your name on the designated line on the green and white answer sheet. (Name may be omitted, if you prefer).

3. Your reaction to items 1-41 should be recorded in the appropriate blank on the Answer Sheet. With pencil, blacken the letter which corresponds to your reaction to the statement, using the following key.

   A means you strongly agree with the statement
   B means you agree
   C means you are uncertain
   D means you disagree
   E means you strongly disagree with the statement

   Note the answer blanks are numbered horizontally, not vertically. Erase completely any mistakes or changes. Your initial reaction is suggested: do not spend a lot of time on each item. Answer each item.

4. Items 42-45 are questions which are to be answered using the blank space provided. Use the reverse side of this Questionnaire if additional space is needed.

5. After completing the Questionnaire, check to see if all items have been completed, then mail both the Questionnaire and Answer Sheet using the envelope provided. No postage is necessary.

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Please be frank and honest in answering the following items. You are a prime source of information regarding necessary revisions of the program and lessons. Notice that the term "program" refers to the Instructional Television (ITV) broadcast to your classroom. "lesson" refers to the Science for the Seventies (SFTS) lesson you taught after the ITV program.

Items 1-14 refer to the ITV program

1. I was often unsure of what, exactly, I was supposed to be doing during the ITV program.
2. After using the program, I felt that I had learned either important background knowledge about science or valuable teaching skills.
3. The topics presented in the program are a valuable aid to help students to investigate science.
4. The student reactions (questions, statements, etc.) during the program were such that the program did not achieve its objectives.
5. The students became bored watching the program.
6. Teaching with the program was fun.
7. Too much information was presented to the children in a short time.
8. There was much irrelevent information in this program.
9. Frequent use of the number cues on the TV screen detracted from the objectives.
10. The program had serious gaps and did not blend together well.
11. The examples used in the program to illustrate the main points were excellent
12. The vocabulary contained many unfamiliar words. Students often did not understand what was going on.
13. The idea of using an interactive television program to promote science learning is a waste of time.
14. I felt I was "put on the spot" by discussion breaks in the ITV program.

Items 15-18 refer to the SFTS lesson

15. I have sufficient subject matter preparation to enable me to teach this lesson.
16. The lesson was well organized with concepts highly related to one another.
17. At the end of the lesson, students based many of their conclusions on evidence uncovered during the lesson.
18. I would volunteer to try out future lessons that SFTS publishes.

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Items 19-28 refer to both the program and lesson.

19. I plan to use more of the teaching methods (for example, questioning, wait-time, etc.) from the program/lesson combination in my teaching.

20. I believe the students learned a lot, considering the amount of time spent on the program and lesson.

21. I prefer the interactive televised program and follow-up lesson to a textbook, workbook, or televised demonstration.

22. The program would not be useful without the follow-up SFTS lesson.

23. After completion of the program/lesson combination, I was favorably impressed with and more interested in the general subject matter than before.

24. The ITV program provided an admirable job of setting the stage for the subsequent SFTS lesson.

25. Some advanced training in how to use the programs and lessons would probably have made this a better learning experience.

26. I attempted to get students to use some of the process skills (for example, observing, measuring, classifying, etc.) from the program later when I taught the lesson.

27. I would have liked to ask questions (via telephone or in person) of a SFTS representative before I used the program or lesson.

28. I believe the adjustment to this mode of instruction could be made easily; teaching this way would be enjoyable.

Items 29-41 are general statements about the ITV/SFTS experience

29. I have a better understanding of the processes of science (and how to teach them) after using this program/lesson combination.

30. I disagreed with at least one of the teaching techniques or SFTS goals advocated in the program or lesson.

31. When I taught science in the past, my emphasis has been more oriented toward learning science facts or concepts than toward science processes skills such as observing, measuring, classifying.

32. The teachers guide was well designed, making it easy to follow instructions and lead discussions.

33. I feel satisfied that I used the materials in the manner in which they were intended to be used.

34. I understood the teachers guide better after I taught the program and lesson than after I simply read it over.

35. Students learn science better by doing things with science than by reading about or listening to someone tell about science.

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36. The teachers guide proved valuable direction to help me conduct the program.

37. During the lesson, I consciously tried to use some of the teaching techniques illustrated in the ITV program.

38. The teaching skills and learner processes are of limited value in teaching areas other than science.

39. I expect to incorporate some SETS lessons in my science lessons next year.

40. When the complete ITV series is broadcast in the future, I expect to use it as an aid to inservice professional improvement.

41. I would recommend this way of teaching science to my fellow teachers.

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Write your answers to questions 42-45 in the spaces provided below. Use the back of this questionnaire if additional space is needed.

42. What, if any, was the most difficult part of the program or lesson for you?

43. What, if any, was the easiest part of the program or lesson for you?

44. Did you find it necessary to make any modifications or adjustments to the recommended procedures? If yes, what changes did you make, and did you feel they were more effective?

45. In the space below, please write any additional comments, suggestions, or changes which will improve the program, the lesson, or the teachers' guide. Thank you.

THE PENNSYLVANIA STATE UNIVERSITY

THEN UNDER EACH LETTER BLACKEN THE APPROPRIATE LETTER SPACE.

START ▶ LAST NAME | FIRST INITIAL | MIDDLE INITIAL

SPECIAL CODE

SECTION NUMBER

USE PENCIL - DO NOT USE PEN

BE SURE MARKS ARE BLACK AND COMPLETELY FILL THE SPACES

ERASE COMPLETELY ANY MARKS YOU WISH TO CHANGE. DOUBLE MARKS ARE USUALLY COUNTED WRONG.

TEST FORM

A
B
C
D
E

START ▶ SOCIAL SECURITY NUMBER

1 2 3 4 5 6 7 8 9

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PRINT
FULL NAME _____ LAST _____ FIRST _____ MI _____ INSTRUCTOR _____
TEST NAME _____ FORM _____ COURSE _____ DATE _____

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APPENDIX E

CONTENT ANALYSIS OF ITEMS 42-45 FROM EVALUATION QUESTIONNAIRE: DATA REPORTED SEPARATELY FOR SEVEN SFTS/ITV COMBINATIONS

CONTENT ANALYSIS OF ITEMS 42-45 FROM EVALUATION QUESTIONNAIRE:
DATA REPORTED SEPARATELY FOR SEVEN SFTS/ITV COMBINATIONS

Investigating Mystery Boxes[1]

(n=39)

Question 42:

A) In relation to the material:
   1- Getting the required material - 15
   2- Knowing when and how to present the material - 1

B) In relation to the time:
   1- Pauses were too short to get student's answers - 6
   2- There is no constancy in the alloted time; sometimes it is too short, sometimes it is too long - 1
   3- Children had difficulty in adjusting to the pauses during the program - 1
   4- Not enough time to do all the suggested activities - 1

C) In relation to the lesson:
   1- Knowing when to ask the initial questions - 1
   2- Knowing how much of the lesson to teach - 1
   3- Learning a new technique - 1
   4- Getting children to use descriptive words or words of comparison rather than to name the object - 1

D) In relation to the program:
   1- Long periods of silence and the numbers in the panels caused children to lose the idea of what was going on - 1

E) None - 5

F) Some teachers showed anxiety and concern about how the program would function - 4

G) No answer - 1

Question 43:

A) In relation to the program:
   1- Taking part in TV program - 9
   2- The visual manipulation of the boxes in the comparison of objects in TV - 2

B) In relation to the lesson:
   1- The follow-up activities - 1
   2- Activity number two - 1
   3- The use of the material - 1
   4- Listening to the discussion - 1

---

[1] Underlined number denotes the frequency of occurrence of a given comment per SFTS/ITV combination.

5- Watching class reaction - 1
6- Getting children's interest and participation - 9

C) In relation to the guide:
1- Following the guide - 1

D) None - 4

E) No answer - 9

Question 44:

A) No - 18

B) Yes - 15
1- Reduce the amount of material making children work in groups - 2
2- Cut down on the activities - 2
3- Modify the technique - 3
4- Substitute the objects in the boxes - 6
5- Use the easiest part of the lesson - 1
6- Minor changes - 1

Question 45:

A) In relation to the TV program:
1- Children should know what was in the mystery boxes presented in TV - 3
2- Pauses could be longer to get children participation - 2
3- The music was very appropriate - 1
4- Numbers in the corner of the picture should be omitted - 1
5- Programs should not be the same for different grades - 1

B) In relation to the lesson:
1- Follow-up to the program was time consuming and complicated - 1
2- Smaller amount of material should be required - 1
3- Inexpensive and easy to secure material should be used in the mystery boxes - 1
4- The amount of exercises to be taught should be suggested - 1
5- Children were very interested - 3
6- Lessons were very well organized and interesting to present - 2
7- The follow-up was very well planned and easy to conduct - 1
8- Teachers should be strongly cautioned to accept all responses and refrain from providing answers - 1

C) In relation to the guide:
1- The lesson presented in the guide is different from what was presented in TV - 1

D) No comments so far - 1

E) Enjoyed the project - 1

F) No answer - 17

Investigating Siphons

(n=12)

Question 42:

1- Not knowing from the guide what was going to happen - 3
2- Finding the right questions to draw out the children - 1
3- Getting the material to have the follow-up - 3
4- Children seemed to have limited vocabulary and had no idea what a siphon was - 1
5- None - 3

No answers - 1

Question 43:

1- Observation of procedure on TV - 1
2- Watching TV lesson - 2
3- Getting children participation within pause period - 1
5- None - 3

No answers - 5

Question 44:

A) No - 6
B) Yes - 2

B1 - Substitute the material - 1
B2 - Using just one center for experimenting because of lack of equipment - 1

No answer - 4

Question 45:

A) In relation to the program:
1- It was very difficult to tell if the water was in the tube. They should have used some ink to color the water - 1

2- The show man should have explained what he was doing with the siphons because his hands were always covering the siphons - 2

B) In relation to the lesson:
1- The lesson was not too effective because we could not get the material in time to do the follow-up - 1
2- There are not too many concepts to be learned in this lesson - 1
3- Suggestion - work with smaller groups - 1
4- Children enjoyed the program and the follow-up - 1

No answers - 6

Investigating Salt and Water

(n=33)

Question 42:

A) In relation to the TV program:
   1- Knowing how much time was allowed for class discussion during the show - 1
   2- Knowing when to ask the questions - 1
   3- Knowing if the no-talking activities in the beginning of the program were intentional or not - 1
   4- Getting children to think of the answers during the pauses - 1
   5- Lack of enough time for discussion during the show - 3

B) In relation to the material:
   Getting the materials ready - 11

C) In relation to the lesson:
   1- Trying to discover the objectives of the lesson and the lesson plan - 1
   2- Teaching the lesson - 1
   3- Finding time to perform all the SFTS activities - 1
   4- Keeping children working rather than playing with the materials - 1
   5- Getting children to understand the concept of salt solution - 1
   6- Having children perform measure activities - 1

D) In relation to the guide:
   Following the teachers guide during TV program - 1

None - 5

No answer - 4

Question 43:

1- Watching TV program - 6
2- Guiding the discussion during the program - 3
3- Teacher-student reactions during the phase - 1
4- Having outcomes of the experiment - 1
5- Getting children's interest - 2
6- Leading children to a discussion during the activities - 4
7- Having children to learn by themselves - 1
8- Performing the activities - 1
9- Following the guide - 1
10- None - 4

No answer - 10

Question 44:

A) No - 13

B) Yes - 16

B1- Reduce the amount of material having children working in groups - 7
B2- Performing activity one before watching TV program - 1
B3- Have each child perform activities of measuring, stirring, and others - 1
B4- Explain to the first graders what was the lesson about before having them watch the show - 1
B5- Exclude some activities because of lack of material - 3
B6- Ask some of the children to perform activities at home and report to the class in the following day - 1
B7- Carry on discussion during the program at various times than the designated ones - 1
B8- Use the observation techniques because of lack of material - 1

C) Modifications were not more effective - 3

Modification was very effective - 1

No answer - 5

Question 45:

A) In relation to the TV program:
1- Children were very interested in the program - 1
2- It should have less narration on TV show - 1
3- The silent activities in the beginning of the program made us confused - 1
4- There should have been longer time for discussion - 1
5- There should have been some clue to start the discussion, because the final broadcast statement did not always correlate with the statement in the guide - 2

B) In relation to the material:
1- The materials for some activities were too complicated to obtain in a brief time - 1

C) In relation to the lesson:
1- Additional activities with sugar solution, epsom salt, and glue, could be presented - 1
2- The lesson is not adequate for first graders - 1
3- Project requires facilities which do not exist in the classroom - 1
4- It might be easier to see if each child observed and measured his own jar of salt and water - 1

D) In relation to the guide:
1- No need to include so many paragraphs, statements, or diagrams - 1
2- It is necessary to coordinate the teachers guide for this lesson - 1

No comments so far - 2
No answer - 18

Observation and Description

(n=15)

Question 42:

A) In relation to the program:
   1- Getting children answers within a short pause period - 3
   2- To hear the teachers and childrens' responses because of background sounds in the program - 1
   3- Motivating children's response during TV program - 1

B) In relation to the lesson:
   1- Getting children to keep their object a secret - 1
   2- Avoid helping children to name good characteristics - 1
   3- Trying to keep children's attention - 1
   4- Analyzing level of children's response in activity one - 1

C) None - 3

D) No answer - 3

Question 43:

A) In relation to the program:
   1- The game part at the beginning of the TV program - 1
   2- TV program - 2

B) In relation to the lesson:
   1- The follow-up game - 3
   2- Getting children motivated - 1
   3- Description by students of their objects - 1
   4- Getting responses from the children - 1

C) None - 2

D) No answer - 5

Question 44:

A) No - 8

B) Yes - 2
   1- Give the children questions ahead of time so they could think about them and participate more during program - 1
   2- Change the technique - 1

Question 45:

A) In relation to the program:
1- Children enjoy pause period where they can participate, although the slow ones find it difficult to get their answers within the alloted time - 1
2- Children became bored watching other children playing a game on TV with an object they couldn't see - 2
3- Program's objectives were very good, but the presence of children on the screen made students very inattentive - 1
4- A little more time was needed for pupil responses during TV program - 2
5- Children did not seem to respond as well to this program; looks like they lose interest participating in the program - 1

B) In relation to the lesson:
1- I enjoyed using this meth' very much, but if this program is going to be used again, introducing it to the teachers by way of a sample TV program is necess - 1

C) No answer - 7

Investigating Eyes

(n=23)

Question 42:

A) In relation to the program:
1- Discussing the illustration (part of eyes) with children - 1
2- Not enough time during discussion periods - 2
3- Realizing that the image and number did not follow the sequence presented in teacher's guide - 4
4- Knowing exactly when to respond and how much help to give the children - 2
5- Knowing when the discussion time starts - 1

B) In relation to the lesson:
1- Finding enough material - 1
2- Getting participation from slow children - 1
3- Using the blindfolds efficiently - 1
4- Finding time to do all the activities - 1
5- Finding large picture of an eye - 1

C) None - 2

D) No answer - 6

Question 43:

A) In relation to the program:
1- Watching the little girl - 1
2- The TV program - 2
3- Getting children's attention to the pictures and activities - 1
4- Getting children motivated - 1

B) In relation to the lesson:

1- The follow-up activities - 3
2- Discussion - 1

C) None - 3

D) No answer - 11

Question 44:

A) No - 9
B) Yes - 3
1- Change the technique because of the small amount of bean bags - 1

2- Eliminate some of the follow-up lessons due to lack of time - 1
3- Discuss eyes before the program; however if we waited to discuss after the program, it would be more effective - 1

C) No answer - 11

Question 45:

A) In relation to the Program:
1- Why didn't the illustrations touch on the lens? - 1
2- The commentator has a pleasant speaking voice - 1
3- Children's attention was drawn away from TV image and discussion due to the activities of clapping hands, looking at their classmates eyes, etc... - 1
4- Program very interesting, but too much to accomplish - 1
5- Not enough time for children's answers during pauses - 1
6- The concepts were not clearly defined in the ITV program - 1

B) In relation to the lesson:
1- The lesson is excellent; very child-centered, of good length, and very motivating - 1
2- Very good lesson - 1
3- General good lesson that children enjoyed - 1
4- More background on the subject should be provided to the teacher on the introduction - 1
5- It was difficult to obtain enough balls and beans for every two children - 1

C) No answer - 13

Question 42:

1- This program was too elementary - 1
2- Watch what was happening on TV, report student ideas on the chalkboard, and motivate at the same time - 1
3- The series of pictures at the beginning of the show was too long and boring - 1
4- The program was most enjoyable - 1
5- None - 1

No answer - 10

Question 43:

1- Too easy for second graders - 1
2- The follow-up experiments - 3
3- Getting children responses - 1
4- Activities one and two - 1
5- Watching program and following the guide - 1
6- Watching program and seeing children's reaction - 1

No answer - 7

Question 44:

A) No - 3
B) Yes - 1
1- Cut down on the activities due to lack of time - 1

No answer - 11

Question 45:

A) In relation to the lesson:
1- More background information on the subject matter should be supplied to the teacher - 1
2- I used wax paper, drops, and a tooth pick for this lesson and it was great - 1
3- This was a beautiful lesson; we learned many things about drops; just repeat it - 1

B) In relation to the TV program:
There was not enough action; the music was too loud and long, and at times the tone was not clear - 1

C) In relation to the guide:
The teachers guide should state explicitly the conclusions the children at each grade level should come to, presenting data to which children could compare their findings - 1

No answer - 10

Investigating the Dripping Faucet

(N=19)

Question 42:

A) In relation to the program:
   1- Knowing when interaction between pupils and teacher was to occur - 1
   2- Counting the drips from the second faucet; the drips and sounds were not together - 1
   3- The program did not follow the manual (the concept of what happened to the water as it went down the drain was not presented) - 2

B) In relation to the material:
   1- Having no facilities to conduct suggested activities - 3

C) None - 3

D) No answer - 9

Question 43:

1- Watching the film - 1
2- Counting the drops per minute - 1
3- Listening and discussing during TV program - 1
4- Guiding discussion (children had a lot to say) - 1
5- Follow-up activities - 1
6- Activity 3A -1
7- None - 2

No answer - 11

Question 44:

A) No

B) Yes
   1- Measuring the water wasted every hour - 1

No answer - 15

Question 45:

1- Children were very interested in the program - 3
2- Some of the pictures showing water were not clear to the children - 1
3- The film about the ways we use water and background music were great - 1
4- Due to present schedule it was not possible to do the follow-up lessons - 2

No answer - 12

APPENDIX F

OBSERVATION SCHEDULE OF ALTOONA TEACHERS

OBSERVATION SCHEDULE OF ALTOONA TEACHERS

Date	Lesson	Teacher	School	Grade	Observer
March 29	Mystery Boxes	None observed			
April 5	Salt and Water	Vonarx	Wright	2	deMelo
		Iorio	Wright	1	Szabo
		McConnel	Wright	2	Snyder
		Johnson	Pl. Valley	2	deMelo, Snyder, and Szabo
April 12	Siphons	Davinsizer	Fairview	2	deMelo
		Mauk	Fairview	3	deMelo
		Morris	Fairview	1	Snyder
		Seidel	Fairview	2	Snyder
April 19	Observation	Lanshe	Curtin	2	Snyder
		Walters	Wright	1	Snyder
		Orr	Wright	1	deMelo
		Carrig	Curtin	2	deMelo
		Fair	Baker	1	Szabo
		Isenberg	Wright	2	Szabo
May 10	Eyes	Brown	Penn-Lincoln	1	deMelo
		Walters	Wright	1	deMelo
		Reitz	Adams	2	Snyder
		Orr	Wright	1	Snyder
May 17	Faucet	Ammerman	Greenwood	1	deMelo
		Seidel	Fairview	2	deMelo
		Gieg	Greenwood	2	Snyder
		Grimm	Fairview	2	Snyder
		Hausknecht	Irving	1	Szabo
		Hescox	Greenwood	1	Szabo
May 24	Drops	Harnish	East End	1	deMelo
		Substitute	Edison	1	deMelo
		Unverdorben	Washington	1	Snyder
		Delozier	Lakemont	2	Snyder
		Fowler	Penn-Lincoln	2	Szabo
		Dilsauer	Stevens	1	Szabo

APPENDIX G

OBSERVATIONAL SUMMARY OF VISITS TO ALTOONA CLASSROOMS DURING AND AFTER THE ITV PROGRAM BROADCAST

LESSON II - INVESTIGATING SALT AND WATER

Date: April 5, 1973

Teacher Observed: #1

Observer: Ana Maria de Melo

1) Activities related to the TV program executed prior to the broadcast: None.

2) Teacher-student environment during the ITV program: Interaction during the ITV program consisted of 24 teacher statements, and 17 student answers. Teacher verbal behavior consisted mostly of exploration questions (8) and learner supportive statements (10); in less amount she used clarification statements (4), one memory question, and one pursuit question. Student participation was mainly voluntary answers (13) and four complying. The teacher was not sure of when to start interaction during pauses and waited for some cue from TV. As no numbers appeared on the screen in this lesson, she missed the first two questions. She repeated the ITV questions, and sometimes she restated the questions without waiting for student answers. Students were very interested in the show, anxious to participate, but not all of them could give answers because it took time for the teacher to realize when discussion periods were operating.

3) Teacher-student environment after the ITV program: There was no follow-up activity. The teacher asked two exploration questions but did not wait for student's answer. She came to talk to the observer about having missed the first two questions.

LESSON II - INVESTIGATING SALT AND WATER

Date: April 5, 1973

Teacher Observed: #2

Observers: Ana Maria de Melo, Ron Snyder, Dr. Szabo

1) Activities related to the TV program executed prior to the broadcast: None.

2) Teacher-student environment during the ITV lesson:

Interaction during the program consisted of 47 teacher statements and 17 student answers. The teacher presented a broad variety of verbal behaviors, including: 17 exploration questions, 8 clarification statements, 5 learner supportive statements, 5 process statements, 3 memory questions, 3 predict/infer questions, 2 pursuit questions, 2 informs, 1 wait-time, and 1 reproof. Learners participation was mostly voluntary answers (13), and complying answers (4). The first question was missed. The teacher followed the guide and it always took her some time to start discussion during pauses. During discussion she brought salt and water to be smelled by students in order to give them hints for participation. Students were very attentive and interested.

3) Teacher-student environment after ITV program: During the follow-up; students were involved in the salt and wat[illegible]xperiments; meanwhile, the teacher questioned the students, checked their activities, and gave directions.

Students brought in salt and water in jars from home and the teacher gave to each student the suggested material, performed activities of measuring and stirring. Although students were working individually,

the directions were given to the group; this made some of them anxious to know the steps to follow in order to work in their own pace.

LESSON III - INVESTIGATING SIPHONS

Date: April 12, 1973

Teacher Observed: #5

Observer: Ana Maria de Melo

1) Activities related to the ITV program executed prior to the broadcast: The teacher wrote a small sentence about Thursday being a special day because of the broadcasted science program, and read it with students.

2) Interaction during the program: 42 teacher statements and 23 student answers. Teacher verbal behavior consisted of 19 exploration questions, 10 process statements, 5 learner supportive statements, 4 predict/infer questions, 3 informs, and 1 pursuit question. Student interaction was totally voluntary. The teacher used the broadcast statement or question to start interaction during discussion periods, but she did not restate the questions; she looked at childrer with raised hands and asked for their answers. Children were very attentive to the show, but did not respond well. The teacher had to repeat the ITV questions before children would raise their hands. She frequently encouraged the students to observe the processes illustrated on the screen. She used two lead questions during non-discussion periods.

3) Teacher-student environment after ITV program: There was no follow-up. After the show the teacher discussed the processes presented in TV and reviewed with children the material used for the experiments. Interaction after the show consisted of 8 exploration questions, 4 predict-infer questions, 3 memory questions, 2 informs, 1 learner supportive statement, and 13 voluntary answers.

LESSON III - INVESTIGATING SIPHONS

Date: April 12, 1973

Teacher Observed: #6

Observer: Ana Maria de Melo

1) Activities related to the TV program executed prior to the broadcast: None.

2) Teacher-student environment during ITV lesson: Interaction during the program consisted of 29 teacher statements and 22 student answers. Teacher verbal behavior consisted of 10 exploration questions, 8 process statements, 5 predict/infer questions, 3 memory questions, 2 pursuit questions, and 1 inform. Students participation was mainly voluntary answers (18), 3 process statements and 1 complying answer. Students were highly interested in the program and very responsive. The teacher was concerned about the lack of information and directions to lead participation during the program. She missed the first question because she did not know when to start interaction.

3) Teacher-student environment after the ITV program: There was no follow-up lesson. The teacher asked some of the students to perform the experiments at home, and bring a report to be presented in class the following day. Interaction after the program consisted of 4 exploration questions, 2 learner supportive statements, 2 wait-time, 2 memory questions, 2 informs, 1 process statement, 3 student voluntary answers, 2 comply answers, and 1 student process statement.

LESSON III - INVESTIGATING SIPHONS

Date: April 12, 1973

Teacher Observed: #7

Observer: Ron Snyder

1) Activities related to the TV program executed prior to the broadcast: Teacher previewed the lesson by asking questions related to appartus, that was set up in advance.

2) Teacher-student environment during ITV lesson: Interaction during the program consisted of 18 teacher statements and 17 student answers. Teacher verbal behavior consisted of 7 pursuit questions, 5 exploration questions, 2 learner supportive statements, 2 reproof, 1 memory question, and 1 predict-infer question. Student participation consisted of 7 voluntary answers, 6 comply answers, and 4 student process statements. Students were anxious to answer ITV questions, and were very pleased when their answers matched the TV performance. There was a loss of picture during the fourth and sixth periods. The lab activity started during the seventh discussion period and continued after the programs. As they only had one equipment center, some students performed the experiment and the others observed. Students were very interested and pleased. The teacher used food coloring in the water to add emphasis.

3) Teacher-student environment after the ITV program: The lab experiment continued. Interaction during the follow-up was coded as: 8 clarification statements, 7 reproof statements, 6 learner supportive statements, 5 pursuit questions, 5 process statements, 3 exploration questions, 1 memory question, 1 predict/infer question, 13 voluntary answers, and 6 student complying answers. Teacher questions were of inquiry nature.

LESSON III - INVESTIGATING SIPHONS

Date: April 12, 1973

Teacher Observed: #8

Observer: Ron Snyder

1) Activities related to the ITV program executed prior to the broadcast: Teacher previewed lesson by stating a problem related to siphons, and reviewing the Salt and Water and Mystery Box lessons.

2) Teacher-student environment during the ITV lesson: Interaction during the program consisted of 41 teacher statements and 25 student answers. Teacher verbal behavior consisted of 12 exploration questions, 9 process statements, 5 learner supportive statements, 5 clarification statements, 4 pursuit questions, 4 wait-time, 1 memory question, and 1 reproof statement. Student participation was totally voluntary. Children were very attentive; they seemed to enjoy the lesson. The teacher was very pleased with the programs and their results.

3) Teacher-student environment after the ITV program: There was no follow-up lesson. For about five minutes the teacher reviewed the last part of the TV show. Interaction after ITV program consisted of 3 exploration questions, 2 learner supportive statements, 1 process statement, and 6 student voluntary answers.

LESSON IV - OBSERVATION AND DESCRIPTION

Date: April 19, 1973

Teacher observed: #9

Observer: Ron Snyder

1) Activities related to the ITV program executed prior to the broadcast: None.

2) Teacher-student environment during the ITV program: Interaction during the TV program consisted of 45 teacher statements, and 59 learner answers. Teacher verbal behavior consisted of 19 exploration questions, 7 clarification statements, 5 informs, 4 learner supportive statements, 3 process statements, 3 wait-time, 2 reproof statements, and 2 pursuit questions. Learner participation consisted of 28 process statements (category 14), 24 voluntary answers, and 7 comply answers. Teacher listed student responses, and wrote the name of five senses on the chalkboard.

3) Teacher-student environment after the ITV program: Teacher led the game presented on TV for follow-up, then turned the game over to the students who led it for several items. Interaction during follow-up consisted of 82 teacher statements and 104 learner statements. Teacher verbal behavior consisted of 18 clarification statements, 16 process statements, 15 informs, 10 exploration questions, 4 reproof statements, 1 wait-time and 1 predict/infer question. Teacher gave homework, asking children to bring to class one object in a bag to perform activity suggested in guide. The teacher showed the observer the learning station she had set up for previous SFTS lessons.

LESSON IV - OBSERVATION AND DESCRIPTION

Date: April 19, 1973

Teacher observed: #10

Observer: Ron Snyder

1) Activities related to the TV program executed prior to the broadcast: Teacher previewed the program, mentioning process skills of observation, description, inferring, and interpreting, and held up a plastic multi-colored clown for kids to verbally describe. Kids were interested, volunteering information.

2) Teacher-student environment during ITV program: Interaction during the program consisted of 47 teacher statements and 37 student statements. Teacher verbal behavior consisted of 24 exploration questions, 8 process statements, 6 reproof statements, 5 clarification statements, 3 learner supportive statements, and 1 pursuit question. Learner participation consisted of 15 process statements, 14 voluntary answers, and 8 comply answers. At first students were very restless and seemed uninterested in the show, but as the questions were asked they became very interested and volunteered for answers.

3) Teacher-student environment after the ITV program: Interaction during the follow-up consisted of 48 teacher statements and 56 learner statements. Teacher verbal behavior consisted of 13 learner supportive statements, 13 clarifying statements, 7 exploration questions, 5 informs, 4 reproof statements, 3 predict/infer questions, 2 pursuit questions, and 1 wait-time. Learner participation consisted of 30 volunteer answers, 21 process statements, 4 questions, and 1 complying answer. Follow-up consisted of the "I see something" game presented during the program. It lasted 10 minutes.

LESSON IV - OBSERVATION AND DESCRIPTION

Date: April 19, 1973

Teacher observed: #11

Observer: Ana Maria de Melo

1) Activities related to the ITV program executed prior to the broadcast: Teacher and students played a game in which they had to describe an object and explain what they used to describe it. As the students were naming the different senses, the teacher made a list of the senses on the chalkboard. Students were very responsive, and participation was enthusiastic.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 42 teacher statements and 22 student answers. Teacher verbal behavior consisted of 22 exploration questions, 4 process statements, 4 informs, 4 learner supportive statements, 3 reproof statements, 1 pursuit question, and 1 predict/infer question. Learner participation consisted of 18 voluntary answers and 4 complying.

During the show children's interest presented some variation. At the beginning they seemed very interested and eager to participate; in the middle of the program, however they presented a dispersive behavior, chasing each other, moving chairs, talking in parallel. The teacher was worried with discipline and used some reproving and directive questions to make students attentive. The attitude of the teacher waiting for the appearance of the number in the screen to start discussion was very monotonous, and might have contributed to children's dispersion.

3) Teacher-student environment after the ITV program: Interaction during follow-up consisted of 32 teacher statements and 30 student statements. Teacher verbal behavior consisted of 17 exploration questions, 6 informs, 2 learner supportive statements, 2 clarifying statements, 2 pursuit questions, 2 wait-time, and 1 reproof. Student participation consisted of 19 voluntary answers, 4 complying answers, 4 process statements, and 3 questions. During the follow-up the teacher discussed the ITV program, and played the ITV game "I see something."

LESSON IV - OBSERVATION AND DESCRIPTION

Date: April 19, 1973

Teacher observed: #12

Observer: Ana Maria de Melo

1) Activities related to the ITV program executed prior to the broadcast: Students were informed of what they were going to see in TV, and were asked to describe some objects in the classroom (scissors, piece of marble).

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 43 teacher statements, and 30 learner statements. Teacher verbal behavior consisted of 20 exploration questions, 12 learner supportive statements, 5 pursuit questions, 2 clarification statements, 2 informs, 1 reproof, and 1 process statement. Students were attentive and very interested in the program answering questions of the narrator, describing the objects presented on the screen. Teacher used the broadcast statement or question to start discussion. During the program she wrote on the chalkboard the name of the objects children had described during the program, and the name of the five senses.

3) Teacher-student environment after the ITV program: Interaction during follow-up consisted of 60 teacher statements and 41 learner statements. Teacher verbal behavior consisted of 33 exploration statements, 17 learner supportive statements, 7 informs, 2 process statements, and 1 reproof. Learner participation consisted of 33 voluntary answers and 8 complying answers. During follow-up the teacher played a game that turned out to be very complicated for the students, making them lose interest in it.

LESSON IV - OBSERVATION AND DESCRIPTION

Date: April 19, 1973

Teacher observed: #13

Observer: Dr. Szabo

1) Activities related to the ITV program executed prior to the broadcast: Students individually presented stories or observations about science.

2) Teacher-student environment during ITV program: Interaction during the program consisted of 42 teacher statements and 29 student answers. Teacher verbal behavior consisted of 23 exploration questions, 7 clarifying statements, 4 learner supportive statements, 3 pursuit questions, 3 informs, 1 memory question, and 1 predict/infer question. Students verbal behavior consisted of 28 volunteered answers, and 1 process statement. The teacher did not use lesson guide during the program. Students attention was super. Students were very responsive; teacher had to verbally cut off discussion.

3) Teacher-student environment after the ITV program: Interaction during the follow-up consisted of 74 teacher statements and 43 student answers. Teacher verbal behavior consisted of 26 informs, 20 exploration questions, 7 learner supportive statements, 7 clarifying statements, 6 memory questions, 6 predict/infer questions, and 2 pursuit questions. Learners participation consisted of 27 volunteered answers, 6 questions, 6 process statements, and 4 complying answers. Teacher commented that Mystery Boxes and Salt and Water lessons were very useful for first graders. She said that after Mystery Boxes lesson, she gave out boxes with list and children wrote on list what they thought was in each box.

LESSON IV - OBSERVATION AND DESCRIPTION

Date: April 19, 1973

Teacher observed: #14

Observer: Dr. Szabo

1) Activities related to the ITV program executed prior to the broadcast: None.

2) Teacher-student environment during ITV program: Interaction during the program consisted of 31 teacher statements and 27 student answers. Teacher verbal behavior consisted of 12 learner supportive statements, 12 exploration questions, 4 informs, 2 clarifying statements, 2 process statements, and 1 pursuit question. Students participation consisted of 27 volunteered answers. Picture quality was not good; there were some picture vibration. Also some background voices were coming through the video. Waits for discussion periods were agonizing. Teacher used much verbal reinforcement.

3) Teacher-student environment after the ITV program: No follow-up activities. Students immediately got involved in something else with a different teacher. Mrs. Isenberg observed that student response was less than desirable and suggested that it was because this class was low.

LESSON V - INVESTIGATING EYES

Date: May 10, 1973

Teacher observed: #15

Observer: Ana Maria de Melo

1) Activities related to the TV program executed prior to the broadcast: Teacher reviewed the concepts learned by children in the early lessons, emphasizing the last one (Siphons).

2) Teacher-student environment during ITV program: Interaction during the program consisted of 51 teacher statements and 26 student answers. Teacher verbal behavior consisted of 21 exploration questions, 10 informs, 8 clarification statements, 5 process statements, 4 learner supportive statements, 2 pursuit questions and 1 predict/infer question. Teacher participation consisted of 24 voluntary answers and 2 complying. Children were very interested and willing to participate. Teacher tried to get as much children participation as possible. She used many inform statements while encouraging pupils to perform activities suggested during TV program. Classroom atmosphere was very informal and children seem to have very good relationship with the teacher. Teacher was very concerned in calling student's attention to important points presented in ITV program.

3) Teacher-student environment after ITV program: There was no follow-up.

LESSON V - INVESTIGATING EYES

Date: May 10, 1973

Teacher observed: #16

Observer: Ana Maria de Melo

1) Activities related to the TV program executed prior to the experiment: Teacher talked with the students about the program they were going to see, calling their attention to the clues for starting discussion.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 66 teacher statements and 25 learner statements. Teacher verbal behavior consisted of 24 exploration questions, 12 process statements, 12 informs, 6 learner supportive statements, 3 wait-time, 3 predict/infer questions, 3 clarification statements, 2 pursuit questions, and 1 memory question. Learner verbal behavior consisted of 15 voluntary answers, 8 complying and 2 process statements. Children were very interested in the program, but a little excited about the TV equipment for videotaping one of the classes. Teacher had to be very skillful to make them forget about the other class.

3) Teacher-student environment after the ITV program: Interaction during the follow-up consisted of 60 teacher statements and 22 student answers. Teacher verbal behavior consisted of 21 exploration questions, 13 informs, 6 learner supportive statements, 5 process statements, 4 pursuit questions, 4 reproof statements, 3 wait-time, 2 predict/infer questions, 1 clarification statement, and 1 memory question. Learner verbal behavior consisted of 16 voluntary answers, and 6 complying. Follow-up consisted of repeating experiments performed during the show, and description of observation by students.

LESSON V - INVESTIGATING EYES

Date: May 10, 1973

Teacher observed: #17

Observer: Ron Snyder

1) Activities related to the ITV program executed prior to the broadcast: Teacher labeled a three color drawing of the human eye on the chalkboard; told students what the program was about, and discussed parts of the eyes and its function. Earlier in the day there was previous discussion concerning the concepts in the show, including drawing the shades, to demonstrate pupil dilation.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 46 teacher statements and 33 learner statements. Teacher verbal behavior consisted of 11 exploration questions, 9 clarification statements, 5 pursuit questions, 5 informs, 5 process statements, 4 learner supportive statements, 4 wait-time, 1 memory question, 1 predict/infer question, and 1 reproof statement. Student participation consisted of 16 volunteered answers, 13 process statements, and 4 complying answers. Students seemed to enjoy the film portion. They were very attentive, and very active in non-verbal activities executed during the show. Teacher commented positively about the film.

3) Teacher-student environment after the ITV program: Interaction after the program was coded as: 2 informs, and 1 wait-time. There was no follow-up or any special discussion. The teacher had introduced the lesson earlier in the day. However, children were very interested and still had questions.

LESSON V - INVESTIGATING EYES

Date: May 10, 1973

Teacher observed: #18

Observer: Ron Snyder

1) Activities related to the TV program executed prior to the broadcast: Teacher talked about what the show was going to be about.
2) Teacher-student environment during the ITV program: Interaction during the program consisted of 50 teacher statements and 33 student answers. Teacher verbal behavior consisted of 14 process statements, 12 exploration questions, 9 clarification statements, 5 pursuit questions, 3 predict/infer questions, 3 learner supportive statements, 1 reproof statement, 1 wait-time, 1 inform and 1 memory question. Student participation consisted of 14 volunteered answers, 14 process statements, and 5 complying answers. Most of the activities consisted of performing suggested experiments from the ITV broadcast.
3) Teacher-student environment after the ITV program: Teacher conducted a 15 minute follow-up. Interaction during the follow-up consisted of 52 teacher statements and 38 student answers. Teacher verbal behavior consisted of 16 learner supportive statements, 9 informs, 8 process statements, 6 clarifying statements, 6 predict/infer questions, 4 exploration questions, 1 memory question, 1 pursuit question and 1 reproof statement. Learner participation consisted of 17 volunteered answers, 15 process statements, and 6 complying answers.

The first activity consisted of repeating the flashlight experiment presented during the show. Students actively participated and seemed amazed watching the human pupil dilate. The second activity consisted of activity I suggested in the SFTS teachers manual. Teacher suggested that the pupil dilation on the TV needed further development and more video time.

LESSON VI - INVESTIGATING THE DRIPPING FAUCET

Date: May 17, 1973

Teacher observed: #19

Observer: Ana Maria de Melo

1) Activities related to the TV program executed prior to the broadcast: Discussion of what a faucet is and what it is used for.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 34 teacher statements and 28 student answers. The counting of drops during third and fourth discussion periods were not coded. Teacher verbal behavior consisted of 23 exploration questions, 4 clarification statements, 4 pursuit questions, 1 learner supportive statement, 1 inform, and 1 process statement. Learner participation consisted of 28 voluntary answers.
Children were very interested in the program, and very responsive. They had trouble counting drops from the second faucet (minutes) and had to stop counting because teacher informed them they were in a faster pace than desired.

3) Teacher-student environment after the ITV program: There was no follow-up activity because there is no faucet in the classroom.

LESSON VI - INVESTIGATING THE DRIPPING FAUCET

Date: May 17, 1973

Teacher observed: #20

Observer: Ana Maria de Melo

1) Activities related to the TV program executed prior to the broadcast: None.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 32 teacher statements and 29 learner responses. Teacher verbal behavior consisted of 10 exploration questions, 9 clarification statements, 5 process statements, 2 learner supportive statements, 2 predict/infer questions, 1 memory question, 1 pursuit question, 1 inform, and 1 reproof statement. Learner participation consisted of 29 voluntary answers.

Children were very active and raised hands, indicating an eagerness to give answers. Some of them were a little excited and tried to disturb the class mainly during the counting at third and fourth periods, resulting in the reproof statements. The teacher used inferring processes in asking students to predict how many drops of water could have occurred in one hour, based upon the data they had from the two dripping faucets.

Discussion was sometimes extended into the nondiscussion periods.

Teacher and students seemed to enjoy the program.

3) Teacher-student environment after the ITV program: The follow-up consisted of a discussion of the program and the concepts the students should have acquired, relating them to health education concepts (necessity of taking bath), and to the social science lesson about water distribution in Altoona.

Interaction after the program consisted of 42 teacher statements and 24 learner answers. Teacher verbal behavior consisted of 18 exploration questions, 13 informs, 3 reproof statements, 2 process statements, 2 learner supportive statements, 2 clarifying statements, 1 memory question, and 1 pursuit question. Learner verbal behavior consisted of 22 voluntary answers, 1 question and 1 process statement.

LESSON VI - INVESTIGATING THE DRIPPING FAUCET

Date: May 17, 1973

Teacher observed: #21

Observer: Ron Snyder

1) Activities related to the ITV program executed prior to the broadcast: None.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 84 teacher statements and 68 learner statements. Teacher verbal behavior consisted of 21 learner supportive statements, 18 informs, 14 memory questions, 9 exploration questions, 7 predict/infer questions, 6 pursuit questions, 4 process statements, 2 clarification statements, 2 reproof statements, and 1 wait-time. Students participation consisted of 33 volunteered answers, 33 process statements, and 2 questions. The teacher wrote number of drips on the chalkboard.

3) Teacher-student environment after the ITV program: Interaction during follow-up consisted of 57 teacher statements and 69 student answers. Teacher verbal behavior consisted of 15 learner supportive statements, 12 exploration questions, 10 predict/infer questions, 5 pursuit questions, 4 memory questions, 4 informs, 4 process statements, 2 clarification statements, and 1 reproof statement. Student verbal behavior consisted of 35 process statements, 32 volunteer answers, and 2 compliance responses. The teacher demonstrated with help of a clock and a student the number of minutes in one hour and performed activity II presented in SFTS teachers guide.

The students were very active during follow-up.

Teacher expressed satisfaction with programs she had seen.

LESSON VI - INVESTIGATING THE DRIPPING FAUCET

Date: May 17, 1973

Teacher observed: #22

Observer: Ron Snyder

1) Activities related to the ITV program executed prior to the broadcast: Teacher introduced the lesson by its title, and questioned the students on their knowledge of faucets. Students volunteered answers.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 36 teacher statements and 37 student answers. Teacher verbal behavior consisted of 9 exploration questions, 6 informs, 5 clarifying statements, 5 process statements, 4 learner supportive statements, 4 pursuit questions, 2 memory questions, and 1 predict/infer questions. Student participation consisted of 20 volunteered answers and 17 process statements. The teacher missed the sixth cue, and part of the fifth.

3) Teacher-student environment after the ITV program: Teacher commented that the recommended time for follow-up was too long for a classroom activity. In place of this she gave a homework assignment. Students were asked to count the number of drops from a dripping faucet in 15 minutes.

LESSON VI - INVESTIGATING THE DRIPPING FAUCET

Date: May 17, 1973

Teacher observed: #23

Observer: Dr. Michael Szabo

1) Activities related to the ITV program executed prior to the broadcast: Faucet in rear of the classroom was adjusted so as to drip. The teacher called the attention of the students to the dripping.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 64 teacher statements and 47 student statements. Teacher verbal behavior consisted of 15 informs, 13 memory questions, 12 exploration questions, 11 pursuit questions, 10 learner supportive statements, 3 predict/infer questions. Learner participation consisted of 43 volunteered answers, and 4 questions. In some cases, the audio and video of the drips were not synchronized. Teacher answered questions during nonquestion periods.
The students counted drops aloud. They had trouble counting drops from the second dripping faucet because they kept the cadence from the first faucet. The drops were hard to see.
There were two adult interruptions.

3) Teacher-student environment after the ITV program: Interaction during the follow-up consisted of 100 teacher statements and 59 student statements. Teacher verbal behavior consisted of 31 learner supportive statements, 31 informs, 13 predict/infer questions, 10 memory questions, 9 exploration questions, 3 pursuit questions, 2 reproof statements, and 1 clarifying statement. Student participation consisted of 54 volunteer answers, 4 questions and 1 comply answer.

Follow-up consisted of discussion of uses of water, how to conserve it etc. Restlessness increased gradually to a considerable degree. Students talked of related and unrelated activities.

LESSON VI - INVESTIGATING THE DRIPPING FAUCET

Date: May 17, 1973

Teacher observed: #24

Observer: Dr. Michael Szabo

1) Activities related to the TV program executed prior to the broadcast: Students performed individualized short readings in Science.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 24 teacher statements and 21 student answers. Teacher verbal behavior consisted of 7 memory questions, 6 learner supportive statements, 5 exploration questions, 3 predict/infer questions, 2 informs, and 1 pursuit question. Student participation consisted of 21 volunteer answers. The teacher remained at her desk using manual; students had to turn to see her. Later she moved and corrected the situation.

   The class discussion ran out during the first discussion period.

   Teacher wrote comments on board during last TV scene.

3) Teacher-student environment after the ITV program: Interaction during the follow-up consisted of 84 teacher statements and 44 student answers. Teacher verbal behavior consisted of 28 informs, 20 predict/infer questions, 14 learner supportive statements, 9 memory questions, 7 exploration questions, 3 pursuit questions, 2 clarifying statements, and 1 reproof. Students participation consisted of 43 volunteer answers and 1 complying answer.

   Not having a faucet, teacher used a large syringe with colored water to perform follow-up activities. She conducted an experiment to see how long it would take to fill a small jar half full, but forgot to check the clock for time. Some students noted the clock. While doing the experiment, she related story of dripping water in her basement.

#24 continued

Teacher asked kids to get any jar and collect dripping water for any time. She urged them to not waste water in bathroom, etc....

LESSON VII - INVESTIGATING DROPS

Date: May 24, 1973

Teacher observed: #25

Observer: Ana Maria de Melo

1) Activity related to the TV program executed prior to the broadcast: None.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 35 teacher statements and 17 student answers. Teacher verbal behavior consisted of 20 exploration questions, 4 informs, 3 learner supportive statements, 3 wait-time, 2 process statements, 1 clarification statement, 1 predict/infer question, and 1 reproof statement. Learner participation consisted of 17 voluntary answers. The classroom TV set was broken and students went to the kindergarten class to watch ITV program.
Children were very excited and somewhat unattentive at the beginning, talking to their colleagues during the introductory portion. During the program, however, interest and attention were higher. Only a few students volunteered to give answers.

3) There was no follow up. The teacher had not planned to perform this lesson because of the problem with the TV set.

LESSON VII - INVESTIGATING DROPS

Date: May 24, 1973

Teacher observed: #26

Observer: Ana Maria de Melo

1) Activity related to the TV program executed prior to the broadcast: None.

2) Teacher-student environment during ITV program: No interaction during the program. Teacher and students watched the program. At first students were very interested and attentive to the program, mainly during the introductory portions. After the first two discussion periods without interaction, attention decreased; children started talking with each other.

3) Teacher-student environment after ITV program: Interaction after the program consisted of 34 teacher statements and 19 learner statements. Teacher verbal behavior consisted of 18 exploration questions, 6 informs, 3 predict/infer questions, 3 wait-time, 2 learner supportive statements, and 2 pursuit questions. Students participation consisted of 18 voluntary answers and 1 complying. During the follow-up, the substitute teacher discussed with children what they had seen in the program. She asked about their experiences with drops of water and related the lesson with the rainy day, asking children what happens to the rain drops that fall on their umbrellas, raincoats, or clothes. This led to talking about absorption of the drops by some materials. She brought a glass of water to the class and gave each child some drops for them to play with.

Very active teacher; good questions.

Children were very responsive.

LESSON VII - INVESTIGATING DROPS

Date: May 24, 1973

Teacher observed: #27

Observer: Ron Snyder

1) Activities related to the ITV program executed prior to the broadcast: None.

2) Teacher-student environment during the ITV program: Interaction during the program consisted of 52 teacher statements and 71 student answers. Teacher verbal behavior consisted of 12 learner supportive statements, 12 exploration questions, 10 informs, 7 process statements, 5 pursuit questions, 3 clarifying statements, 2 memory questions, 1 predict/infer question. Students participation consisted of 43 process statements, 27 volunteer answers, and 1 question. Students were very active and following the introductory portion, answered questions and proposed solutions.

3) Teacher-student environment after the ITV program: Interaction during follow-up consisted of 57 teacher statements and 77 student answers. Teacher verbal behavior consisted of 42 process statements, 33 volunteer answers, and 2 complying answers. Teacher ran a very active question and answer period. The students seemed very interested. Follow-up lasted aoout 12 minutes and it was closed by an agreement to conduct more experiments with drops later on.

LESSON VII - INVESTIGATING DROPS

Date: May 24, 1973

Teacher observed: #28

Observer: Ron Snyder

The teacher had decided not to continue with the SFTS project. She and the other teacher at this school saw only one program and presented the following reasons for discontinuing the SFTS/ITV series:

1) Negative aspects:
   1 - Too much of classroom time on Science, especially on the follow-up.
   2 - Science is not preferred to language arts skills instruction.
   3 - Teachers have to prepare the children for grades to come.

2) Positive aspects of the program:
   1 - The language progress was at a level the children could handle.
   2 - Quite interesting to students.

The teachers involved already had an ongoing science program (30 to 60 minutes per week) which is seasonal and biologically oriented.

LESSON VII - INVESTIGATING DROPS

Date: May 24, 1973

Teacher observed: #29

Observer: Dr. Szabo

1) Activities related to the TV program executed prior to the broadcast: Teacher oriented students to the upcoming ITV program and discussed water drops with the class.

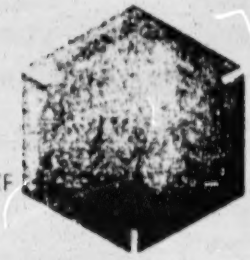
2) Teacher-student environment during the ITV program: The interaction during the program consisted of memory (9), exploratory (8), and prediction (6) questions; 5 reinforcement statements, and 7 informing statements. There were 23 student volunteering responses.
As the program began, the teacher was diverted to take care of a student whose nose began to bleed. Afterward the teacher expressed pleasure with the level of student participation and observed that the class was a) not her regular class and b) the lowest of three verbal ability groupings.

3) Teacher-student environment after the ITV program: The teacher led a brief discussion which included reinforcement (6), memory (9), exploratory (9) and prediction (1) questions, and 11 informing statements. There were 19 voluntary responses and one pursuit question. No manipulative activities followed and the teacher did not take advantage of the observational experiences present in the rain drops on the window of the classroom.

APPENDIX H

REACTIONS OF PPTN ITV ADVISORY COMMITTEE

Manager, Educational Services



WITF A Media Center for the Community ◻ TV 33 · FM 89.5 · Film · Print

October 1, 1973

Dr. Nile D. Coon
Director
Bureau of Instructional Media Services
Pennsylvania Department of Education
Box 911
Harrisburg, Pennsylvania 17126

Dear Dr. Coon:

I appreciated the opportunity to attend the SCIENCE FOR THE SEVENTIES preview meeting at Penn State on September 12 and 13 representing WITF.

As I expressed at the conclusion of that meeting, I believe the programs previewed will be educationally valuable to the primary classrooms of the Commonwealth. The programs appeared to be of an above average technical quality--especially those done in color. Our viewing of both the programs and the tapes of classrooms viewing them demonstrated the successful execution of the unique formats employed in the series. I was particularly pleased with the extensive audience research data the SFTS team had compiled regarding the use of these programs by the intended audience. The team's sensitivity to the needs of their target was very apparent and should help to insure the effective use of these programs in the classroom.

Because of the unique teaching strategies teachers will need to employ in using these materials, I encourage the PDE to support the SFTS team in their plans for fully developing the proposed print materials, utilization workshops, and in-service programs to accompany this series. I would recommend that their request for $140,000 to enter into similar productions for the intermediate level (phase II) be funded if it can be demonstrated that the "new" production undertaking would not detract from the team's efforts to prepare, disseminate, and help coordinate the effective statewide use of their primary series (Phase I).

I would recommend that two of those programs be included in the PPTN November Previews. Favorable classroom reactions to those broadcasts would help to insure that the series is included in WITF-TV's 1974-75 broadcast schedule. If final materials are available by January, 1974, WITF would be willing to consider the broadcast of these programs as early as this spring. I have kept a number of time periods open this year for such purposes.

Dr. Edgar had requested feedback from us regarding the order of presenting programs. My only suggestion is that the non-verbal program be scheduled last.

I have only one suggestion for future SFTS programs. The team may want to consider another way of signifying the number of seconds the classroom has to discuss a segment during a "cut away" within a program. Phase I programs supered a single number on the TV screen which was then referred to in the teacher's guide materials telling how many seconds the "cut away" lasted. The SFTS team may want to consider use of combined alphameric and numeric "codes." A super such as A-30 could cue the teacher to refer to the "A" suggestions in the guide, and that the "break" will last "30 seconds."

Again, thank you for the opportunity to preview these materials. I hope PPTN stations will have an opportunity to broadcast two programs during the November Previews so that the series can be considered for broadcast during the 1974-75 school year.

Sincerely,

Richard L. Hair
Manager, Educational Services

pm
cc: Dr. Irvin T. Edgar, PDE
Mr. Blaze Gusic, PDE
Mr. Robert Gibson, PPTN
Dr. Robert F. Larson, WITF
Dr. Paul Welliver, Penn State

Phones: 344-9551 to 344-9558

Northeastern Educational Intermediate Unit

200 ADAMS AVENUE — SCRANTON, PA. 18503

DR. P. M. MENSKY
Executive Director

CLINTON S. WEISENFLUH
Asst Executive Director

Curriculum and Instructional Services
WILLIAM H. CRUM, Director

September 24, 1973

Mr. T. Robert Gibson
Director Program Operations
169 W. Chocolate Avenue
Hershey, Pa. 17033

Dear Mr. Gibson:

I am in complete agreement with the SFTS approach to utilizing T.V. to implement the science program. I have felt for a long time that the use of a T.V. presentation as a lead in to a lesson is far superior to teaching that lesson on film. It serves as an invitation to inquiry for the students (motivational) and insures that the teacher and students will do the experiments together afterward. This is in keeping with the "hands on" process philosophy of the SFTS approach to teaching science. I felt that for the most part the tapes were well done and would accomplish the purpose for which they were intended.

I also feel that the tapes are well done from an educational viewpoint and are well correlated with the teachers guide and printed materials. They should make any elementary teacher feel comfortable in teaching the SFTS lessons in spite of any lack of scientific training or background.

I would like to see these programs offered to teachers as in-service for credit through the in-service councils of the intermediate units. Since they should be set up and operating at this time it would seem the most effective and expeditious way to reach all teachers in all districts of the Commonwealth.

I see some merit in suggesting that the order in which these tapes are presented is important. I feel that you should start with the most structured, e.g. investigating water drops, and go last to the least structured, e.g. reflections of light beams.

I am interested in using all of the SFTS materials for workshops and in-service programs in the twenty school districts of N. E. I. U. #19. I will be most happy to work with the department in any way I can to disseminate these materials to our constituent school districts. Hopefully they will allow our teachers to see alternatives to what they are now doing and serve as a bridge to adoption of some of the national alphabet programs, e.e. SAPA, SCIS, ESS, etc.

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If possible, I would like to see even more experiments written, tapes made and in general, more materials developed along the same lines.

I may be biased but I think SFTS is an excellent program leading us in the right direction in elementary science education.

Please advise me of any way in which I might be of help in promoting the program.

Sincerely,

William J. Murray

William J. Murray
Science Consultant

WJM:hh

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REACTIONS TO SPTS BY THE AEBC

Educational Value: Excellent, the approach to actively involve the student with the instruction is novel and long overdo. It is hoped that along with encouraging the implementation of different teaching strategies, the teacher would also record student reaction to those strategies and analyze whether this behavior can be generalized to other subject matter areas.

Technical Value: Good, and with a few minor revisions could be excellent. In one segment, talking could be heard above the dialogue. In another segment a stop watch was used which may confuse children accustomed to a regular watch face.

The series demonstrates how effective educational materials can be produced without spending large amounts of money for "slick" productions.

Printed Materials: Satisfactory. They should be used in conjunction with a good pre-service program. Previewing of the materials and the shows must be encouraged. During Phase II, the printed material might be evaluated and revised before a final copy is printed.

Inservice Credit: Recommended. It is this type of motivation that is needed to encourage teachers to participate in workshops, etc. directly related to their teaching assignments. The Department of Education should make it easier for local school districts to get approval and administer credit programs which have been standardized and will be given in many parts of the Commonwealth.

Order of Presenting Programs: Sequence should not be standardized. A sequence should be recommended but it should be stressed that the series can be and probably should be used in any sequence that the utilizing Council desires.

Describe your plans for utilizing SPTS: SPTS provides a convenient vehicle for the teacher to interact with the students and the media, rather than to compete with a television screen for student attention. The concept of active participation during the viewing of the program also makes the teacher a participant of the learning process and encourages him or her to follow-up the presentation with teacher or student-initiated activities.

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One of the more interesting spin-offs of the program design is the provision for teachers to observe whether a child prefers a purely verbal presentation (Salt and Water) or a non-verbal presentation (Reflections of Light Beams). This, we feel, is an important consideration for the educational environment. It can provide the perceptive teacher guidelines for accomodating individual differences in the classroom and utilizing all forms of media to realize that goal.

Last, the format of the programs allows the utilization specialist to experiment with various ways television may be used effectively in the classroom. It allows that specialist to observe different teaching techniques and how these techniques interact with individual student behaviors. It also encourages both the teacher and the designer of television programs to supplement the instruction with other forms of media that complement the program rather than interfere or compete with it.

What Changes Do You Suggest For Future Programs In Phase II: An instructional television utilization person be added to the committee to aid in planning for Phase II. It seemed that several comments produced by the various utilization personnel could have benefited the production of the series while in progress, not at the evaluation stage. Since this program is to be aired in the geographic areas these utilization personnel are servicing, their opinions about that educational climate and the status quo of the utilization of instructional televisions within these areas should be a welcome addition to the planning of Phase II.

General Comments: Recommended that: (1) Field-testing be continued since many of the reservations participants verbalized during the meetings were answered by the evaluation of the field-testing program. (2) A close relationship between Phase I evaluation and revision and Phase II planning be continued. (3) Teacher-related materials be developed by the program designers and teachers utilizing the series as anticipated by the discussion at the meeting. (4) The contrast and comparison of verbal and non-verbal programs be emphasized, if found an adequate barometer of individual student preferences. (5) Arrangements be made to make the SFTS staff available for work with the Broadcast Councils in their utilization efforts such as workshops, etc.

EVALUATION REPORT

TO: Dr. Nile Coon, Chief, Division of Educational Media

RE.: Science For The Seventies, Phase 1

I had the pleasure of attending a meeting dealing with Science for the Seventies held at Penn State September 12, 13, 1973. I am sure one of the purposes of this meeting was to excite the broadcast council members as to the potential use for the series. In this area the meeting succeeded.

In our Council area (N.W. Regional) most school districts are changing over to inquiry science programs. Many teachers have the desire to change but the mechanics of teacher method, classroom organization, evaluation expectation etc. can block implementation. SFS is a natural to help solve this problem. Teachers who have been approached about using such a series have been unanimous in agreeing to work with it. The use of television as a carrier was well received as you will know when the series will be on, and can therefore count on it while getting programs on 16mm becomes a scheduling problem. However, we would like to explore the use of 16mm with our regional IMC if the series is released on film.

The technical quality of the series may need some tightening up on the audio track for some programs, but the series director was aware of these minor problems and can easily correct them. The video quality was excellent, the programs very well done. There is a wide range of presentation mode from direct to subtle (in showing inquiry behavior) which will be important to evaluate as the series is tested. Color programming on black & white TV sets will also have to evaluated.

The printed materials are sufficiently different from the usual to demand teacher testing before much opinion is given. I hope the initial use of these materials will be as trial editions to be revised after a year of use. My first reaction to them is positive, but I'm sure there would be many excellent additions made after an initial year's use. I would like to explore the use of cue sheets to be passed out to the children before the program starts to help the children concentrate on the program goals.

Inservice for this series must be worked through the curriculum specialists in each school district. SFS should be considered as part of the primary science curriculum AND EXPECTED TO BE USED NOT SUGGESTED AS A SUPPLEMENT. Intense inservice is not needed as the program and series goals are most obvious. This is one of the strengths of the series.

The SFS staff is aware of sequencing needs, but I think the sequence possibilities should be tested this winter and spring.

In our local Council area utilization of SFS will be closely studied during January when I will concentrate on its use in specific test schools. We have teachers ready in a variety of school districts rural, suburban, and urban who will use the series and who have agreed to provide me with feedback. These teachers have been met with and are familiar with the series goals. I am in contact with all science curriculum people in our Council area and will report SFS information to them starting in January. The emphasis here will be to get SFS into the primary science

curriculums within each district. I look at this first year as a "getting used to the series" time where we can explore teacher acceptance, use of written material, sequence, Council distribution service for best use of SFS, and curriculum director familiarization.

We need to explore working with our IU to develop a concurrent RITEC course that teachers could take to develop their skills as an inquiry teacher. Certainly SFS would be an intregal part of such a course. This course would be designed this spring and offered next September.

As SFS moves into Phase II I suggest no intermediate programs be done until the evaluation of SFS-ITV primary be accomplished. The most important result of SFS may be its potential as a change mechanism for teachers and children. I hope that item #3 in the proposed activities be the major thrust for SFS.

Lastly, I have a great deal of trust and confidence in the people working this project. They have been honest, professional and inquiry-minded themselves in all my dealings with them. I look forward to receiving the pilot report of SFS-ITV use in the Altoona School District, and to coordinating our testing with the department when we start SFS-ITV this January.

SFS-ITV can only be evaluated as it is used in the classroom, and I don't pretend to be able to give this evaluation at this time. However, the potential for this series is obvious and it is up to those of us in the field to properly present it (the series) to the school districts. I look forward to working with SFS on this project.

Rich Daley
Curriculum and Utilization Specialist
N.W. Regional Broadcasting Council

LVETV

WLVT-TV

CHANNEL 39

SOUTH MOUNTAIN DRIVE WEST, BETHLEHEM, PA. 18015
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September 27, 1973

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Dr. Nile Coon
Chief, Educational Media Division
Pennsylvania Department of Education
Box 911
Harrisburg, Pennsylvania 17126

Dear Nile:

This letter is in response to my having attended a two-day session on "Science For The 70's" held at Penn State.

I was most favorably impressed by the efforts of Dr. Welliver and his team.

The preplanning and post-program research surely indicates a strong acceptance by both teachers and students. The series obviously has educational value. I can especially applaud several of their efforts:

The professional approach to the teacher guides (which I feel is fundamental to any ITV series)

The technical quality of the film.

Their procedure for involving the classroom teacher in the programs.

My reaction to a continuation of "Science For The 70's" project into Phase II is favorable.

Sincerely,

Frank Dobias
Director of School Services

FD/ner

COPY FOR ~~CBX~~ → Bob Gibson, PPTN
Blaze Gusic, PDE
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Phone 448-3325

File #308
October 3, 1973

Dr. Irvin Edgar
Science Education Advisor
Pennsylvania Dept. of Education
Bureau of General and Academic Education
Box 911, Room 566
Harrisburg, Pa. 17126

Dear Dr. Edgar:

Please excuse my tardy reactions to the ITV programs developed as part of Science for the Seventies.

Generally, I am favorably impressed with the technical quality, and their educational value in the area of process as opposed to "show and tell." The programs appear to be the right length for young children and the teacher guide material should be very useful. From my personal experience as an on-camera teacher however, I still have reservations about question periods on TV where everybody is expected to come up with an answer in the same thirty seconds. Hypothesizing and insights seldom happen that way and my criticism therefore simply reflects the limitations of the media and not the programs.

On balance, I think the programs represent a fine and useful effort and I am recommending them to Tri-State for broadcast during the spring (and fall) semester.

I would suggest that you continue the same format for Phase II. You may wish to lengthen the programs to 20 minutes for the older children, and include more topics dealing with living things.

Sincerely yours,

EDWARD H. GOLDMAN
Curriculum Specialist

EHG:s
cc: Mr. Robert Gibson
Dr. Nile Coon
Mrs. Krona Bricklin

Educational Services

4802 Fifth Avenue
Pittsburgh, Pennsylvania 15213

(412) 683-1500

September 24, 1973

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Dr. Nile Coon, Chief
Division of Educational Media
Pennsylvania Department of Education
P. O. Box 911
Harrisburg, Pa. 17126

Dear Dr. Coon:

At the regular monthly meeting of the WQED School Curriculum Advisory Committee held on September 21, 1973, Mrs. Helen Walter, who attended the "Science for the Seventies" Review at Pennsylvania State University, reported on the two day session. Mrs. Walter reviewed the over-all objectives of the project, the programs previewed, plans for in-service education, the teacher guide, and future developments proposed under Phase II. Each facet of her report was then discussed by the Committee as a whole.

At the close of the discussion and questions session, the Committee surveyed the four questions posed by Dr. Edgar at the close of the SFTS Review. It was felt that we could not respond adequately to all the questions without a preview of the student and teacher SFTS television programs. Accordingly the Committee passed a motion to request these sample programs for preview at their meeting on October 19, 1973. Dr. Sceiford will make arrangements for the preview with Dr. Welliver at Pennsylvania State University.

A second motion deferring final evaluation of the series until after the preview was also passed unanimously. After our October meeting, we will send you our recommendations concerning the use of the "Science for the Seventies" Television Programs, primary level, and those for the Phase II proposal. Consideration will be given to including "Science for the Seventies", primary level programs in our Thanksgiving Preview for classroom teachers.

(continued)

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Mr. Nile Coon
-Page Two -

We look forward to previewing these programs and will be particularly interested in any additional definitive plans for in-service activities which may be developed by the SCTS Committee. It is our understanding that Dr. Alfke is working on such a proposal.

Thank you for giving the WQED School Curriculum Advisory Committee the opportunity to participate in the "Science for the Seventies" Review sessions.

Sincerely yours,

Ida Procyk (Miss)
Vice Chairman
WQED School Curriculum
Advisory Committee

IP/ms

cc: Dr. Irvin Edgar
Mr. Robert Gibson
Mrs. Sara Harvey
Mrs. Helen Walter